Eject, Eject!

Four years ago, I watched the crew of an EA-6B eject when they experienced a bad cat shot. Initially, the shot appeared normal, but the Prowler suddenly stopped accelerating shortly into the stroke. It was obvious to the crew and observers that the Prowler would not have enough flying speed when it reached the end of the angle deck. It was also obvious they were caught in the box of being too fast to stop and too slow to fly. I heard several voices from my fellow observers, paralleling my thought, cry out "eject, eject!" as if the crew could hear them. The crew didn't need anyone to tell them; they had already gone for the handles. Almost in slow motion, they began to pop out of the Prowler in rapid succession as it dribbled over the angle and disappeared.

None of the observers spoke, but I could feel the collective desire of all for the crew to make it. As each seat fired, someone counted aloud, "One . . . two . . . three . . ." The Prowler had left the angle as two, and three shot up from below flight deck level. It seemed almost too late as the final seat, the pilot, left the aircraft at 30 feet. Attention was now focused on the small piece of sky where the four seats were shooting skyward like rockets on the fourth of July. It was difficult to make out how each guy was doing as a small piece of sky was filled with parachutes in varying stages of opening and seats falling away. The first three out got normal trajectories, but the last one out almost seemed too slow and too low. Everyone anxiously waited to see if they all got good chutes. All four got good chutes just prior to water entry, and two helicopters were over them almost immediately. The last one didn't get as high, but his chute blossomed just in time.

Conversation now started, and the general consensus was that it had been a close one. Certainly, they could not have ejected any later. Everyone agreed, it would be interesting to hear the crew tell the story from their perspective, once medical and the mishap investigation people got through with them. The pilot never got to tell his version; he didn't make it. One of the falling ejection seats from the rear cockpit, which was higher in trajectory, had fallen through the top of his chute and hit him on the head causing multiple injuries.

Days later, one of the backseaters came down to our ready room and gave his account of the episode. They had ejected as soon as they realized the cat had failed. Their decision was good, and I can't see how they could have made it sooner. Multiplace aircraft like the EA-6B and S-3A take time to get all four aircrew out. By the time the pilot's seat fired, he was on the edge of the envelope. The seat worked fine, but the peculiarity of the geometry caused someone else's seat to do him in. His memorial was a sad affair to attend, but if any good can be taken out of this episode, it is to realize how fine that line is between a successful and unsuccessful ejection. The timing of the decision to eject, especially on the flight deck, is crucial.

LCdr. Dave Parsons
Editor

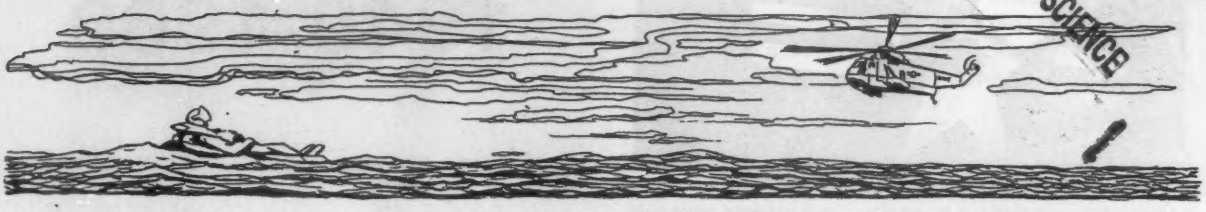
inside approach

Vol. 34 No. 5

Eject! Eject! An F9F Panther pilot at the moment of ejection, painted by Capt. Ted Wilbur, USN (Ret.)

FEATURES

DEPARTMENTS



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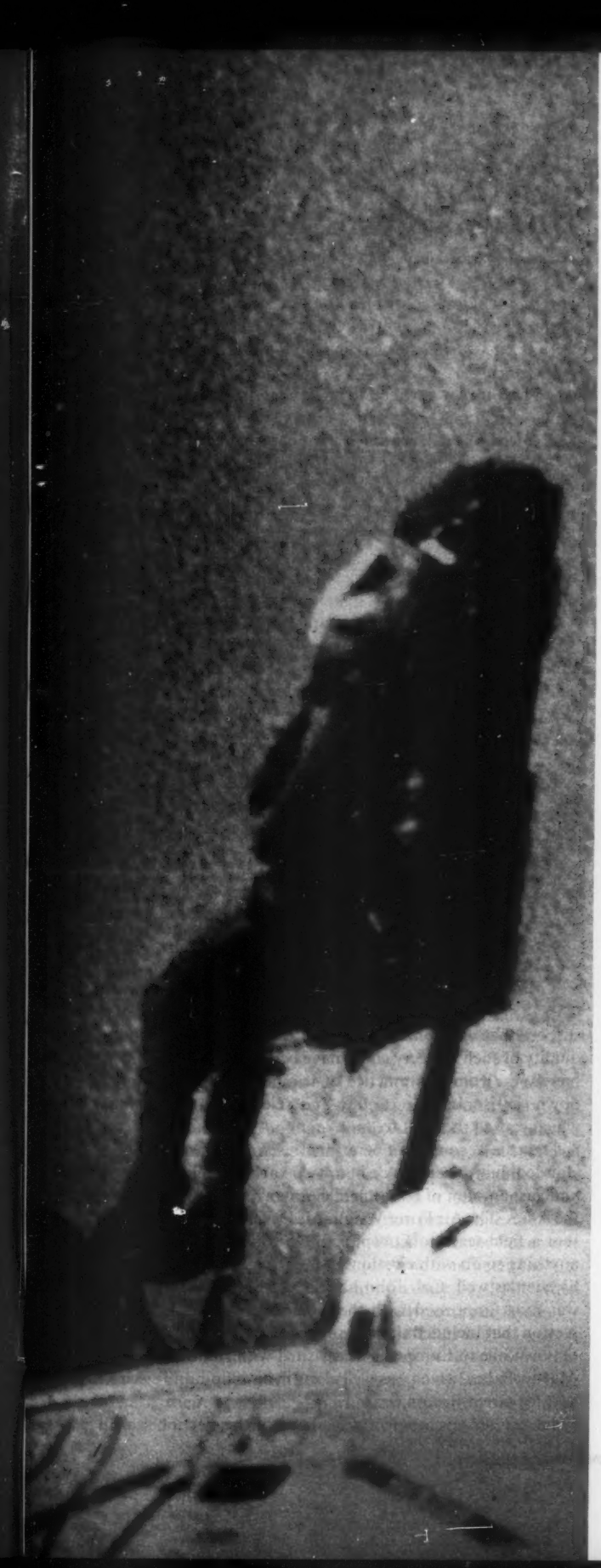
A History of Ejection Seats, 1940-1960

Going "over the side" to bailout was fine until aircraft began flying faster than 400 mph. The ejection seat was developed to get the pilot away from the aircraft — the problem in the early days was to get them to use it.

By LCdr. Dave Parsons

Several thousand naval aviators owe their lives to ejection seats. In the past 40 years, the ability of the ejection seat to give naval aircrews a way out of emergency situations has continually improved in virtually all flight regimes.



TODAY, the ejection seat is a trusted piece of equipment, and no one would consider flying purposely with the seat de-armed. Yet, 40 years ago, it was a common practice. Pilots feared that the "bang seat," as it was called back then, was an invitation to back injury. Ejection seats were constantly improved from 1950 to 1960, a decade when carrier aviation underwent dramatic changes and jets replaced props. The jets' speeds, which increased from subsonic to twice the speed of sound in 10 years, made bailouts all but impossible. Early designs didn't lend themselves to forced landings, ditchings or bailout. This article focuses on ejection seat development during those important years.

Background. In the earliest days of flight, pilots had few options when they found themselves with an aircraft no longer capable of flying. At first, the choice was straightforward: Set the aircraft down on the ground, or if you were over the water and unable to make it over land, ditch it. These techniques worked fairly well as long as the problem was lack of power and the aircraft could still be flown. If the aircraft was out of control with structural damage or on fire, it meant the pilot was out of luck.

The parachute gave pilots another option allowing them to abandon the aircraft in flight. The parachute was a true lifesaver, and by the end of World War I, it had started to win acceptance among aircrew. There still remained some situations, such as an unrecoverable spin, that made it difficult for aircrews to get out of the aircraft; but the parachute was a real boon to aircrews faced with a survival situation, especially in combat. In the U.S., the parachute was first used in an emergency in 1922.

As World War II approached, aircraft capable of speeds in excess of 400 miles an hour were being developed in several countries. A few of the more exotic designs featured rear-mounted propellers that posed a distinct hazard to a pilot trying to bail out. Even in a conventional design, a pilot would have had to fight a strong slipstream in order to get clear of the cockpit. This windblast could keep him from exiting a stricken aircraft or cause the pilot to strike the rear control surfaces. In most cases, striking the tail was fatal or incapacitating enough to keep the pilot from releasing his parachute. The problem facing designers of high-performance aircraft was how to get the aircrew safely away from a stricken aircraft.

Engineers in the United States, Great Britain, Sweden and Germany all began looking for answers as early as 1939. At that time Sweden was working on a 400-mph fighter with a rear-mounted propeller. Both Germany and Great Britain had test-flown jet-powered aircraft that promised to usher in an era of even higher speeds and more difficult egress problems. Although the United States was on the fringe of the war clouds gathering over Europe, it would soon have several 400-mph fighters and its own jet aircraft with engine technology borrowed from the British.

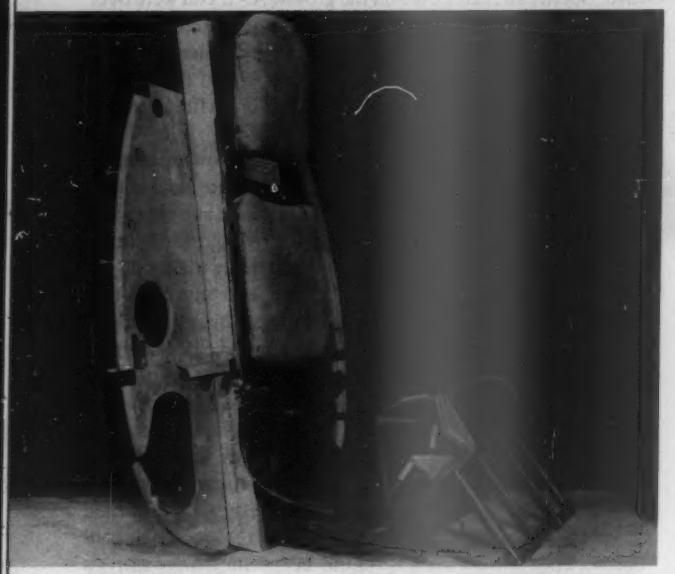
Continued

It took the U.S. Navy over 10 years to get a ground level ejection capability.

War accelerates technological progress, even in neutral nations like Sweden whose aircraft have always been competitive with the best in the world. It was neutral Sweden and belligerent Germany that achieved the earliest breakthroughs in escape technology and produced what came to be known as the ejection seat. German aeromedical personnel remarked after the war that they considered the ejection seat to be their country's greatest contribution to aviation safety during World War II. Both countries fielded aircraft equipped with ejection seats during the war, and Germany recorded the first emergency use in 1943.

The German equivalent of NAVAIRSYSCOM was sold on the value of the ejection seat and directed seats be installed in all high-performance aircraft entering service in 1945 and retrofitted to others still in service.

The first use of an ejection seat in Germany occurred on January 13, 1943, when a test pilot in a He 280 jet fighter experienced severe icing and loss of control and successfully ejected. The He 280 never entered operational service, losing out to the Me 262. The Luftair Reichministrium (their equivalent of NAVAIRSYSCOM) was sold on the value of the ejection seat and directed seats be installed in all high-performance aircraft entering service in 1945 and retrofitted to others still in service. The Swedes developed the Mk I ejection seat for their J-21A fighter, which first flew in 1943; it used an explosive charge to separate the seat from the aircraft. When two J-21As collided in mid-air on July 29, 1946, the one surviving pilot escaped by ejecting. The resourceful German engineers produced several types of seats using just about every power source available — except a huge rubber band.



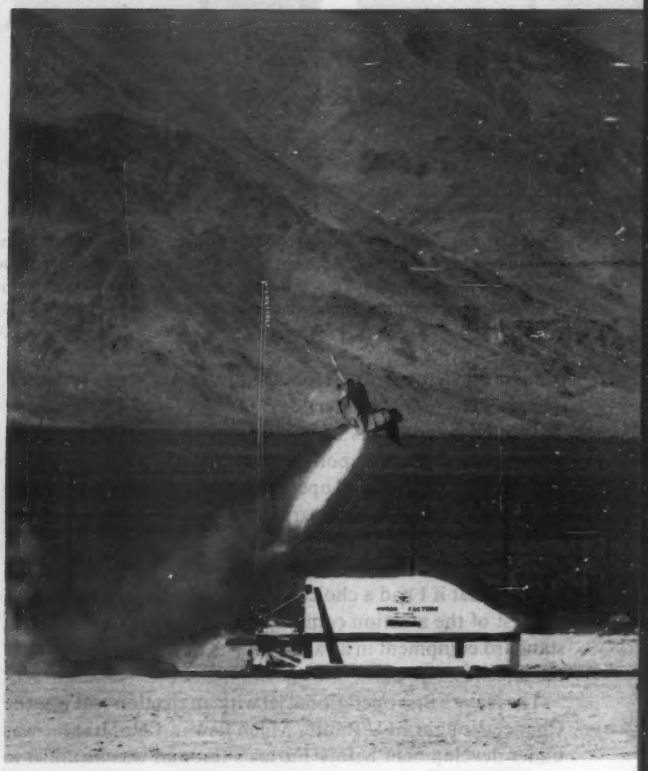
He 162 Salamander ejection seat was used as a reference by U.S. manufacturers.

The Me 163 Komet, the 600-mph rocker fighter, had a large spring, called a *latscher*, under the seat while the 400-mph He 219 Uhu (Owl) night fighter used compressed air. The most advanced design was found in the He 162 Salamander, the poor man's jet fighter. It had an explosive charge under the bucket seat and featured an emergency oxygen supply as well as automatic disconnect from aircraft oxygen and communications. Other designs relied on hydraulic power. No definitive accounting of actual wartime usage has emerged, although a U.S. survey team looking into German ejection seat progress in 1945 reported that up to 60 saves had occurred. Allied gun-camera film showed German pilots "popping like corks" from their disabled aircraft; these photos made engineers first suspect that ejection seats were in use. However, the poor quality of such imagery could have belied the fact that it was merely the common practice of trimming the aircraft nose down, jettisoning the canopy and releasing any restraints which caused the pilot to "pop" out.

The true account of operational use of the seats remains clouded, but the existence of a wide variety of ejection seats and vast amount of research in Germany were a bonanza for the Allies. The Air Force Wright Air Development Command sent a field team to Europe in 1945 to scour Germany for anything to do with ejection seats. They made a side trip to Sweden as well. Col. John Lovelace, who headed the team, was most impressed with the He 162 seat and had a nose section that included the seat sent back to the Wright field in Ohio. While in Europe he also visited with James Martin of Martin-Baker, which was well along in developing an ejection seat for Great Britain.

Jet engine development was ahead of the ejection seat in

Martin-Baker's Mk 5 series seat gave the U.S. Navy flight deck level ejection capability.



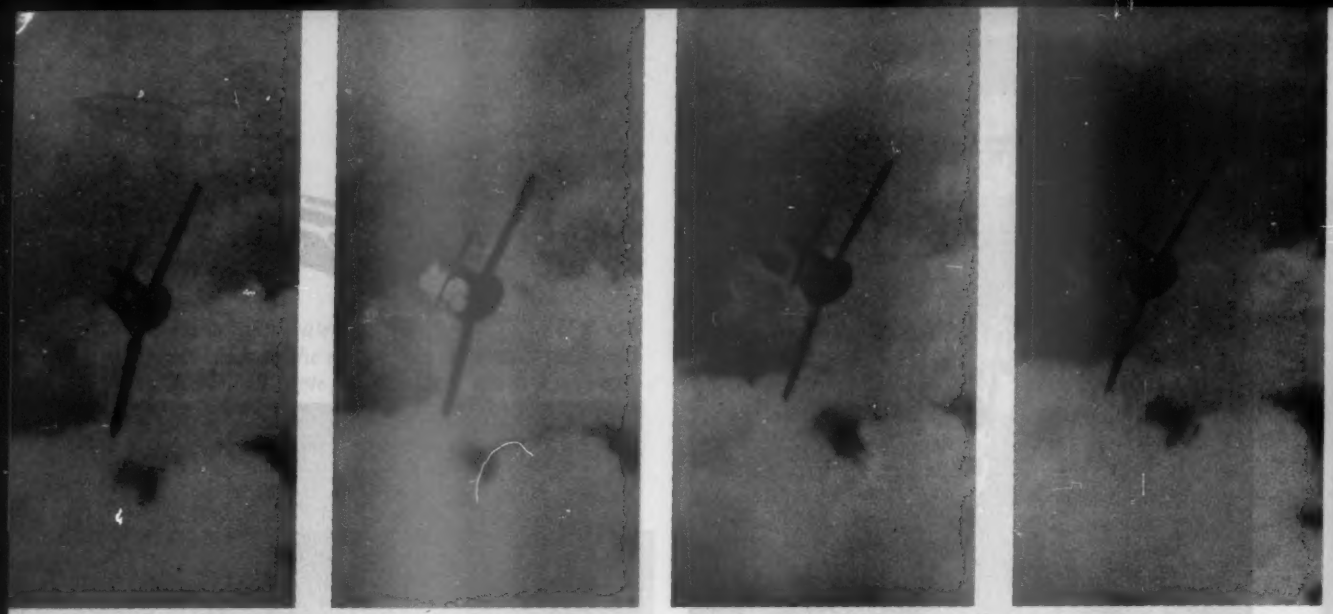
North American's rocket seat was introduced in the T-2 Buckeye and featured ground level capability.

both Great Britain and the U.S. Both the British Gloster Meteor and U.S. Lockheed P-80 jet fighters were in service at war's conclusion without an ejection seat. The death of well-known top American ace, Major Richard Bong, in a P-80 that suffered engine failure on August 6, 1945, dramatized the need for ejection seats and resulted in it becoming a top priority. With Germany out of aviation for a while, the technological edge passed to Martin-Baker. Martin-Baker was developing a seat when the war ended and conducted the first live airborne test in Great Britain on July 24, 1946, when Bernard Lynch ejected out of a specially equipped Meteor.

Meanwhile, the U.S. Navy sent two officers in 1945 to look into Martin's work. The Navy bought a test tower from Martin-Baker along with several seats, and began working toward their own live airborne test. Ejection seats were included in the specifications for the generation of Navy jets then under development. Each manufacturer was expected to design its own seat. The Navy made its own catapult gun and provided it to the manufacturers. Strong political pressure kept the Navy from buying a foreign seat even though Martin-Baker was ready, willing and far ahead of any U.S. manufacturers.

The Air Force knew about the Navy's work and wasn't about to let the Navy be first to record a live airborne test. They secretly assembled a team with a modified He 162 seat. Finally, on August 17, 1946, Sgt. Larry Lambert was fired out of a P-61 Black Widow to become the first person to eject from an aircraft in the U.S. His comment after the ride was "Man, whatta whoomp!" The Air Force, too, asked manufacturers to build their own seats providing a catapult gun built to their specification.

Not far behind the Air Force, the Navy conducted its first



This unusual sequence of pictures of MiG-15 was taken by a camera gun on an F-86 piloted by 2ndLt. Edwin E. Aldrin during a dog fight over Korea on May 14, 1953. From left to right: The first photograph shows that the MiG has just been hit. The second picture shows the MiG at the moment the pilot fires his ejection seat mechanism. In the third, the pilot has just left the aircraft. The final three pictures show the pilot continuing to separate from his abandoned aircraft.

live test on October 30, 1946, when Ltjg. A.J. Furtek ejected from a JD (A-26 Invader) at 5,000 feet and 250 mph. A 28-foot parachute was attached to the seat so it could be retrieved. It streamed upon opening, so Ltjg. Furtek released himself from the seat and opened his service seat chute, which worked successfully. He carried a chest chute as a backup. Afterward, he commented that if given the choice of manual bailout or ejection from a fighter cockpit, "I would take the ejection seat if I had a choice." The problem was to convince the rest of the aviation community. The seats soon became standard equipment in a variety of jets that entered service in the late '40s.

The Navy's first operational jet with an ejection seat was the Chance-Vought F6U Pirate, which flew in 1946. Its seat was under development before Furtek's test and was installed in the Pirate without ever having an airborne live test. Vought's seat designer was Owen Polleys, and he had been given an He 162 seat to use for reference as a Navy catapult gun. The P-80 had an ejection seat introduced into the B model.

In 1949, both the Air Force and Navy recorded their first emergency ejections. Lt. "Pappy" Fruin successfully ejected from his F2H Banshee on August 9, 1949, when it iced up and went into a uncontrollable dive. He decided ejection was his only option, but he wasn't sure if the seat would work since the jet had just been received and many seats were de-armed.

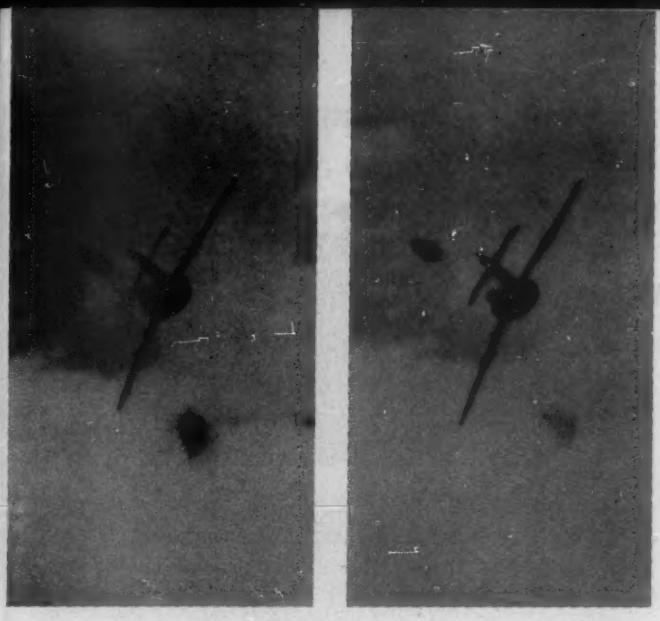
On August 29, 2ndLt. Robert E. Farley, of the 71st Fighter Squadron from March AFB, ejected from his F-86A when his Sabre went into a spin. He punched out at 1,000 feet.

Despite the saves, the seats did not earn immediate widespread acceptance, but, then neither did the parachute when it was first introduced.

The '50s. The idea of being catapulted into space on what was roughly equivalent to a 37mm cannon shell quickly earned the

ejection seat the name "bang seat." The fear of spinal injury led many pilots to choose the traditional options of ditching, forced landing or even manually bailing out. During a test flight at Pax River in 1950, Paul Thayer's XF7U Cutlass burst into flame. Rather than use his ejection seat — which was a follow-on to Polley's Pirate seat that had never been tested with a human subject—Thayer tried to bail out. He released his seat belt and tried to roll inverted and drop out, but the slow response of the trim and encroaching flames led him to resort to the ejection seat. He suffered a fractured coccyx, leading him to say, "I'm the first one to break my ass for the company."

This reluctance to use the seat had apparently been evident



USAF

The idea of being catapulted into space on what was roughly equivalent to a 37mm cannon shell quickly earned the ejection seat the name "bang seat." The fear of spinal injury led many pilots to choose the traditional options of ditching, forced landing or even manually bailing out.

A 3rd Air Rescue Squadron H-19 pulls Capt. Joe McConnell, USAF, from the Yellow Sea after a MiG fatally damaged his first "Beautious Butch" on April 12, 1953. McConnell vowed to avenge the loss with at least 15 MiGs.

USAF

in Germany during the war as well; it is rumored one company offered a reward to the first pilot to use its seat.

Test of Combat. War erupted in Korea in 1950, and before long, ejection-seat-equipped aircraft were flying combat missions. The Navy's first combat ejection occurred on September 24, 1950, when Lt. Carl Dace ejected from a VF-111 F9F-3 after his Panther was disabled on a strafing pass by AAA. He was able to zoom climb from 2,000 to 6,000 feet and make it to sea before ejecting. He was rescued after spending seven hours in a raft.

Astronaut Neil Armstrong might not have made it to the moon if not for an ejection seat. On September 3, 1951, Ens. Armstrong was in VF-51 flying a Grumman F9F Panther on a strafing mission against a column of trucks near Wonsan. A close flak burst knocked his aircraft into a spiraling dive. He recovered at 20 feet off the deck only to immediately hit a telephone pole with his starboard wing, losing 3 feet of it in the process. He managed to climb the stricken Panther to 14,000 feet over friendly territory before ejecting.

Ejection-seat-equipped Meteor F.Mk.8 fighters were also in Korea, flown by the Royal Australian Air Force's 77 Squadron. The first combat ejection from a Meteor was on August 29, 1951, by Flying Officer Guthrie. He latched onto the tail of a North Korean MiG-15 and began firing when a second MiG slipped in behind him and raked his aircraft with 37mm cannon fire. He found his elevator controls had been shot away as his aircraft began rolling uncontrollably to port. He ejected at 38,000 feet, doing Mach .84, and, since he was over enemy territory, he pulled his ripcord at 35,000 feet in order to try to drift toward a friendly area. All he gained was 30 minutes of freedom as he slowly descended into capture and imprisonment. Six other Meteor pilots also ejected before the end of hostilities.

The USAF's leading ace of the conflict, Capt. Joseph McConnell, had to eject on April 12, 1953. Boresighted on a MiG-15, McConnell was after his 10th victory when another MiG slipped in behind him and crippled his Sabre with cannon fire. He nursed the Sabre to the safety of the Yellow Sea before punching out. He was rescued by helicopter and returned to flying status, racking up a total of 16 kills. Tragically, McConnell was killed after the war, testing a late model F-86 at low altitude where his seat could not have saved him.

Allied pilots had the chance to see their adversary's seats work as well. After witnessing several MiG pilot's eject, it became evident that the Communist pilots had a new feature in the MiG-15 seat, an automatic lap belt that hastened the ejection process and permitted the seat to be used at lower altitudes. Allied seats were completely manual. The pilot had to release himself from the seat after ejecting and pull his parachute ripcord. If he was knocked unconscious by the force of the ejection or windblast, he was out of luck. At low altitude, the occupant of a manual seat had a extremely difficult time accomplishing these tasks before he ran out of altitude.

More and more ejection-seat-equipped aircraft were coming into the inventory, and as the ejection seat gained the confidence of aviators, ejections-per-flying-hour rate doubled

ZERO-DELAY LANYARD SAVES THE DAY

While the Martin-Baker and other low-level capable ejection [illegible] were being introduced in 1958-1960, some aircraft still had earlier [illegible] sions like this VF-74 F4D Skyray. During the catapult run the [illegible] struck the F4D, which shortly thereafter burst into flames. At an [illegible] estimated at approximately 250 feet, but possibly more because [illegible] aircraft was in a nose-up attitude with some rate of climb remaining, [illegible] Air Force exchange pilot ejected. The standard Navy seat with optional "Zero Delay Lanyard," performed well, and the pilot splashed well clear [illegible] the wreckage. He was picked up by helicopter and returned to the carri[illegible] within minutes, and with minor injuries.

More and more ejection seat-equipped aircraft were coming into the inventory, and as the ejection seat gained the confidence of aviators, ejections-per-flying-hour rate doubled during 1950-55. The increase reflected a mix of more aviators resorting to the seat as a means to escape and more aircraft having emergencies.

during 1950-55. The increase reflected a mix of more aviators resorting to the seat as a means to escape and more aircraft having emergencies. (The seats were very successful, achieving a 90 percent success rate over 1,000 feet and 82 percent overall at all altitudes.) Thanks to publicity about their successes, the ejection seats slowly gained acceptance as the primary means of escape.

In 1956, an interesting comparison was made that bolstered ejections over ditchings, forced landings and bailouts. An engine-failure study looked at the various options used by aviators between 1953 and 1956:

36 water ditchings	10 fatal	(28%)
57 forced landings	11 fatal	(19%)
136 forced landings	5 fatal	(3%)
33 ejections	1 fatal	(3%)

Consequently, OPNAVINST 3750.12 included a paragraph that directed ejection if a jet flamed out. The only exception was if the landing could be made on a runway during daylight in clear weather. The proposal was also made to incorporate annual training in ejection and escape procedures during the existing low-pressure training. This began today's training at the various Aviation Physiology Training Units (APTUs) across the country. On one occasion, an F9F-5 pilot found himself in an unrecoverable spiral at 4,000 feet. He had no stick response, so he ejected. The seat left the cockpit between 1,500-2,000 feet, and he hit the ground almost immediately upon parachute opening. He had received the ejection seat training lecture that morning; it "probably saved my life," he said.

Low-altitude Problem. Through 1957, 35 ejections had been attempted below 1,000 feet; 34 were fatal. Above 1,200 feet, the success rate was 96.2 percent. Every ejection was scrutinized for ways to improve the seat's capabilities. Initially, the idea for the ejection seat had been to merely separate the aircrew from the aircraft. Once the seats proved that was possible in a wide range of situations, another set of problems cropped up. For instance, once the occupant got clear of the aircraft, how to get into the parachute in time? At medium altitudes and moderate speeds, the seats worked fine. Often, below 1,000 feet, the occupants separated from the aircraft, but their chutes did not deploy before hitting the ground. The manual seat took about 8 to 11 seconds after the catapult fired to put an aviator in a good chute, one to two seconds to eject, five to seven to clear the seat and pull the ripcord, and two seconds for the chute to deploy. That meant the odds of successful ejection below 1,000 feet were quite low. If the aviator was injured or incapacitated, he might not be able to release the lap belt or pull his ripcord at all. Priority was given to developing equipment that would make ejection successful below 1,000 feet.

A simple solution to lowering the minimum altitude of the seat would be to increase the charge propelling the seat and fire the seat higher to get more time for parachute deployment. But, the seats had reached their limit in velocity going from a 60-FPS (feet per second) catapult gun to a 80-FPS version, the limiting factor being the acceleration the occupant could endure before sustaining injury, especially to the spine. Engineers had to look elsewhere to gain the needed time. One solution was to reduce the time presently required for the occupant to clear the seat, which was a whopping five to seven seconds under ideal conditions. Reducing that time became the immediate goal. An automatic seat belt device offered the possibility of eliminating four seconds. The Navy developed a retrofit auto seat belt on all its ejection seats and provided training for all aviators using them.

Martin-Baker's Breakthrough. Martin-Baker attracted the Navy's interest once more with their low-level work. They had introduced their Mk 3 automatic seat that featured not only automatic lap belt release, but parachute opening as well. They solved conflicting demands of various altitudes by adding an aneroid-controlled timing mechanism that operated the seat in rapid sequence for low-altitude ejections, which could be made as low as 500 feet, and a slower sequence

for high altitude. The follow on MK 4 seat promised even more. It featured a duplex drogue system and a .5-second drogue gun that could put the occupant into a chute 2.0 seconds after ejection. The current drogue chute configuration was a compromise for a wide range of ejection speed and altitude combinations. A two-drogue system streamed a small 22-inch controller drogue to get the seat into a horizontal position begin decelerating the seat. This put the occupant into the best position for enduring the deceleration and preventing explosive opening of the 5-foot main drogue at high airspeeds. The important bonus was the time needed between ejection, and main parachute opening could be reduced from five to three seconds. This effectively lowered the envelope to 50 feet, a magic altitude for carrier aviators because it meant they could eject from flight deck level.

U.S. Navy personnel saw the effectiveness of Martin-Baker's new seat while shadowing Anglo-French carrier forces during the Suez crisis in 1956. The Royal Navy had several successful deck-level ejections, which impressed the U.S. Navy pilots aboard USS *Forrestal* (CVA-59). During a later joint port call, the U.S. Navy crews badgered the Royal Navy aviators for information on their ejection seats.

During the '50s ejection seat ground training grew in sophistication and played an important role in increasing the success rate. One pilot ejected from an aircraft the same day he had attended training and credited his survival to it.

Although the aviators who had witnessed the deck-level ejections were convinced, it remained a different matter to convince the higher levels of the Pentagon to buy a foreign seat. The Navy's Bureau of Aeronautics (BuAer) had already been working on getting the Martin-Baker seat into a Navy jet for months. Tagging the project as a "safety of flight item," the installation of a ground-level capable seat was approved in July 1956. BuAer wanted to put the seat in 155 F9F-8T Cougars. A fuselage was sent to England for Martin-Baker to install their ejection seats.

The same arguments that kept Martin-Baker out of U.S. aircraft 10 years prior resurfaced. This time, U.S. manufacturers had 10 years of experience behind them, and although they didn't have a low altitude seat in an aircraft yet, both North American and Convair were close. An Industry Crew Escape System Committee (ISESC) was formed in October 1956 to tackle the low-altitude ejection problem. The committee was composed of 14 major aircraft companies with Convair as the chairman. It was clear that they wanted to solve the low altitude problem, but they also wanted to keep Martin-Baker from getting a beachhead in the states.

With industrial and political pressure to keep American ejection seats in American aircraft, BuAer decided that a ground-level demonstration of the Martin-Baker seat in the States was needed to get the seat into Navy jets. Grumman was asked to provide a test pilot to demonstrate a ground-level ejection at Pax River for all to see. They politely declined, stating a "lack of experience" in the area. (It would be interesting to know what their test pilots thought of the idea). The *Forrestal* returned from the Med with its aviators crying for the Martin-Baker seat. The clamor for the seat from the fleet carried a lot of weight. Martin-Baker realized that a demonstration was crucial and approached the Royal Air Force for a volunteer. Flying Officer Sidney Hughes, a Hunter pilot with 66 Squadron, stepped forward; and by summer of 1957, the F9F-8T with the seat and F/O Hughes were at Pax River.

On August 28, 1957, Hughes ejected from the Cougar at Pax River, convincing everyone that the Martin-Baker seat was the seat to have. Ltjg. Bob Lewis, an F9F pilot assigned to the Pentagon, heard about the demonstration and headed down to Pax River. He told his friends before the demonstration that "this guy's crazy!" When he saw it happen, he exclaimed, "This is it — it'll save a lot of lives!" He was one of many who had been skeptical, but now had been convinced it

The pressing need in the '50s was for a flight deck level ejection capability for situations just like this. The Vought seat in the F7U Cutlass coming aboard the USS *Hancock* on July 14, 1955, did not have a low-altitude capability leaving this pilot no choice but to stay with the aircraft. He did not survive.

could be done. Later, when he transferred to an F3H Demon squadron, the cockpit contained a Martin-Baker seat, and Ltjg. Lewis had no reservations about using it at low altitude).

The sobering fact that no airborne ejections below 1,000 feet had been successful, overcame the political pressure and promises of future seats from U.S. manufacturers. No competitor could deny that the Martin-Baker seat was available right away. An extraordinary engineering effort got underway to retrofit the seats. The Navy wanted the seats in the aircraft in two years, and they got them. Martin-Baker was told to put their seat in 50 F9F-8Ts and work on retrofits for the F3H Demon, F4D Skyray, FJ Fury, TV-2 Seastar, F8U Crusader and F4H Phantom. At times, the seats were stockpiled awaiting cockpits to fill. The first emergency ejections using the Martin-Baker seat occurred in 1958, all from F9F-8Ts. None were at low altitude, so the true test had yet to occur.

Success Below 1,000 Feet. It was not until 1959 that the low altitude problem first showed signs of being solved. The Martin-Baker seat proved itself, as did a number of other systems. There were 18 ejections below 1,000 feet that year and only 7 fatalities. Three of these ejections were from F9F-8Ts with Martin-Baker seats below 250 feet. The 1,000-foot barrier had been broken.

Just because Martin-Baker succeeded in establishing a beachhead in the American market didn't mean all other efforts ceased. There were two other systems that proved successful: the North American rocket seat and the zero-delay lanyard. North American had built their own seat for the T2J Buckeye using a rocket for catapult power. The rocket was integral to the catapult gun and offered a longer burn than a conventional explosive charge. Two T2Js were involved in ejections below 1,000 feet. In one instance, the two occupants ejected at 100 feet successfully and in the other at 800 feet. The last innovation was the zero-delay lanyard. It was a modification to the thousands of seats already in service to improve low-altitude capability. The automatic lap belt and parachute opener were already in use, but the parachute opener time delay was viewed as too long at low altitude. A zero-delay lanyard was devised to circumvent the timer. As soon as the lap belt released the occupant, a snap hook attached to the parachute D-ring would pull the ripcord. Its use was optional, and it was only attached at low altitude (below 1,000 feet); zero delay on parachute opening at high altitude or speeds could be fatal. Later, automatic devices were introduced to sense the proper flight conditions and provide appropriate timing, but in the interim, the lanyard gave aviators a poor man's low-altitude option.

In 1959 there were four ejections using the zero-delay lanyard. All were successful, but all were at medium altitude, so its benefit at low altitude was yet to be proven. It wasn't long before the lanyard proved its worth in a dramatic way. VF-74 was one of the first squadrons to provide the lanyard to its pilots. Lt. James Andrews was a F4D Skyray pilot with the squadron and assigned the job of safety officer after his predecessor ejected. He pushed to get the lanyards manufactured in-house before the impending cruise.

One pilot was glad he did. 1stLt. N.E. Price, an Air Force exchange pilot serving with VF-74, was manning up his Skyray on July 6, 1960, when he noticed the zero-delay lanyard was missing. He sent the plane captain after one. It's a good thing he did. Minutes later as he was fired down the catapult track, the shuttle ramp hit the bottom of the aircraft, rupturing a fuel line and causing the Skyray to burst into flames. He clawed for altitude, reaching 250 feet before the seat left the aircraft. The zero-delay lanyard put him into a chute just prior to water entry. He was rescued almost immediately by the ship's helo with only minor injuries and returned to the ship.

This wasn't the only low-altitude success in 1960. There were 31 more such ejections; two-thirds were successful. Martin-Baker seats in aircraft other than the F9F were used for the first time in F3H Demons. A new seat, the A4D RAPEC (rocket assisted personnel escape catapult) seat, was used successfully at 250 feet. RAPEC was a rocket kit attached to the standard Douglas seat that gave a low-altitude capability similar to the Martin-Baker seat. The seats were installed on the production line starting with the A4D-2N and retrofitted in fleet A4Ds.

Since 1950, aircraft design had gone through tremendous advances that ushered in greater speeds than ever before. The jet engine had only started to supplant the propeller in 1950. By 1960, it dominated carrier air wings. As performance increased, so did escape problems. The ejection seat, which had only begun to be accepted as a primary escape device in 1950, had to mature in design, yet, at the same time, keep up with the rapid advances. It did, to the everlasting credit of the many people whose foresight and hard work kept improving the ejection seat through this tumultuous decade. In 1960, the low-altitude problem had been solved, but more improvement was still ahead. Survival over water after ejection still presented problems, and a true zero-zero seat was yet to be developed. But those solutions appeared later. ◄

LCdr. Parsons is the editor of Approach.

Special thanks to John Boughey (Martin-Baker); Mike Hood (Aviation Research); Peter Mersky (Approach); Capt. Bob Lewis, USN (Ret.) (QED); Cdr. A.J. Furtek, USN (Ret.); Cdr. James Andrews, USN (Ret.); Harry Gann and Lon Nordeen (McDonnell Douglas); Fred Guill (NAVAIR 5311); William Green (Air Enthusiast); and Bob Lawson and Barrett Tillman (The Hook).

An Early Abort is Better Than a Late Ejection

By LCdr. Bob Hummel

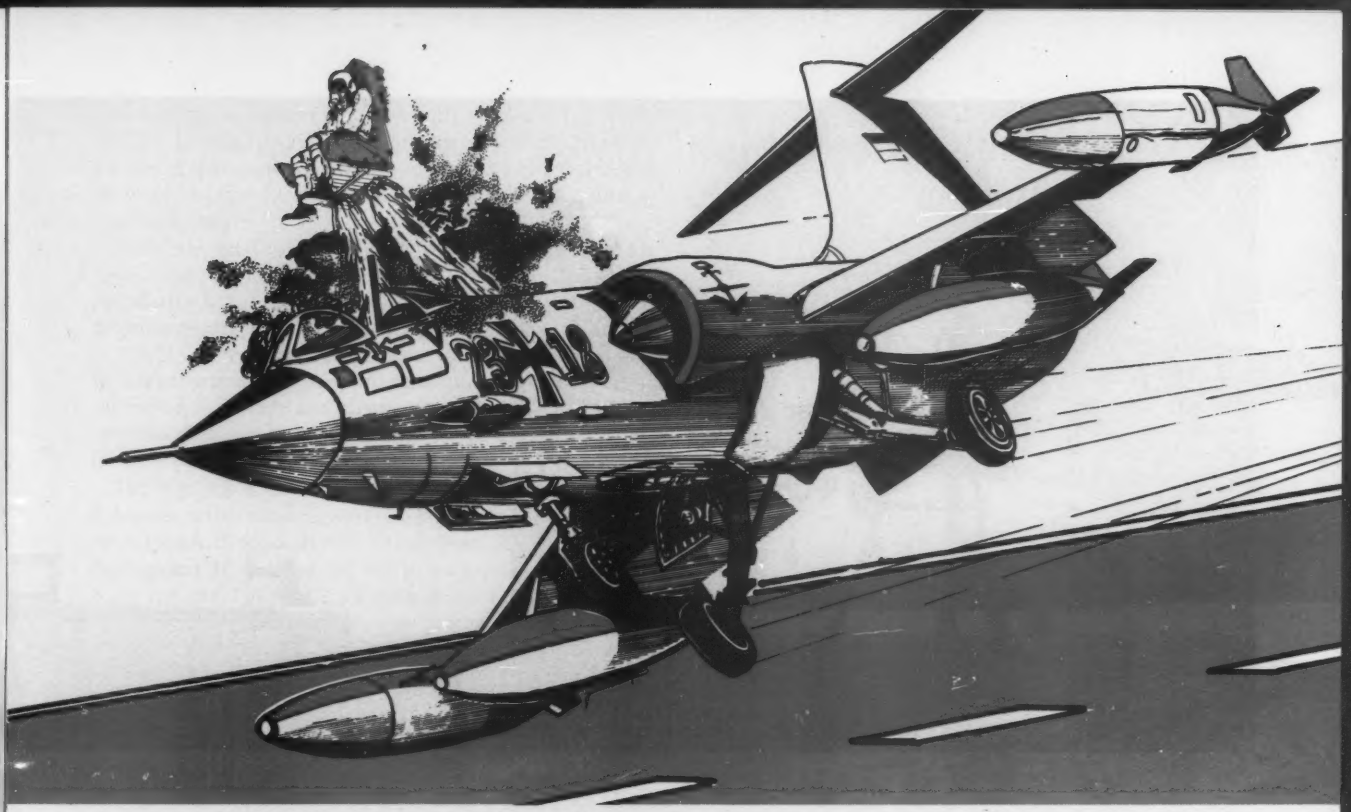
THE Starfighter — a beautiful and sleek machine 20 design-years ahead of her time. She could seduce you with her speed, transitioning to hyperspace in a heartbeat. It was the opportunity of a lifetime: NATO exchange duty with a German F-104G squadron in Europe for 2½ years. The only problem was that the Starfighter had developed the reputation of being a flying mishap looking for a place to happen. In most cases, these mishaps could be traced to non-aircraft related causes, such as bird strikes (destroying the engine) or, the big one, pilot error. The F-104 was honest and gave ample indications to the pilot that he was about to depart. But if you weren't listening when she was talking, she would get your undivided attention almost immediately.

As the only naval aviator in the country, I rapidly achieved the qualifications and experience to fly the F/RF-104G throughout the entire operational envelope and was designated "full combat ready." The tactical training opportunities in central Europe are unparalleled. The air below 9,000 feet belongs to the military with relatively few operating restrictions. And then there were the Baltic Sea and North Sea operating areas in Ivan's backyard. It was some of the best duty and the best flying I've ever experienced.

My mission on one sunny July day was a routine ship service hop. Yep, even our NATO buddies get to fly those fun-filled ship service missions. The sortie was a repeat of the same mission flown earlier in the day, and the brief was completed expeditiously. The aircraft were assigned, and the takeoff performance data was logged on the Mission Flight Order and approved by the operations officer. The flight order is similar to the NAVFLIRS yellow sheet in that it is the official record of your flight, but it also grants authorization to perform a given mission such as weapons training, low-level navigation or DACT.

Following final checks, we taxied onto runway 01 in left echelon for a formation go. The tower gave takeoff clearance, reporting the winds out of the west at 10 to 15 knots. Engine run-ups and control wipeouts were completed, followed by a thumbs-up from my wingman. I gave the signal to release brakes and light the burner. During this transition phase of engine operation, the nozzle opens up prior to the afterburner igniting and results in a notable loss of thrust for one to three seconds. On this section takeoff, my wingman had a quick burner light; I had a slow one. As a result, he ended up acute and accelerating further in front of the lead. It seemed safer to pass him the lead and assume a wing position than have him attempt to reestablish himself in the wing position. I never thought of aborting. So, a positive lead change was executed in the first 1,000 feet to the takeoff roll. If I had known then what I know now, I would have aborted and saved a beautiful, expensive aircraft.

Although I was established in an acceptable wing position at rotation, I was on the downwind side of the formation. The F-104 generates tremendous circulation about the wingtips during takeoffs and landings, and the vortices are often visible. Immediately after becoming airborne it became all too



clear that things were not quite right. A high-speed abort now was out of the question since the aircraft was already rolling through 10 degrees angle of bank to the left and into my lead. While I held full right stick and full right rudder, my Starfighter hesitated for a moment as if the worst was over. Then the left wing began to drop rapidly.

It was time to jettison the reuseable container, and I pulled the lower handle of the Martin Baker MK-GQ7-A ejection seat with my left hand. The aircraft continued to roll and drift as I waited for the eternity of 0.4 seconds to click off. In 30 to 40 degrees angle of bank, at an altitude of maybe 6 feet, the roll reversed violently to the right. The canopy was gone, but I was still in the aircraft. I think that the left wingtip had impacted the runway. A cartwheeling explosion had to follow in the very next instant as the wing was ripped off.

If only I had initiated ejection earlier! If only I had aborted when I first detected the lack of roll control after rotation! If only I would have aborted a fouled up formation takeoff! I heard the roar of the ejection seat rockets and felt the acceleration as I was catapulted clear of my lost craft. I was now an ejection statistic. The seat worked perfectly, giving me about half a swing before landing dead center on the runway. From initial aircraft rotation to nylon landing was about 10 seconds. The crosswind dragged me across the runway about 50 feet until I managed to release my chute. I just laid there on the runway for a moment, waiting for it to start hurting somewhere, then initiated a functional check of the major body parts. They were all still attached; I was, in fact, uninjured. The same could not be said for Starfighter 23+18. She was a twisted mass of fire and metal about a quarter mile away; her flames were being suppressed by the quickly responding crash crew. She became the 191st Starfighter to crash, and it wasn't her fault.

In retrospect, the takeoff should have been aborted when the non-notice lead change occurred. Speeds are slow, and control of the aircraft is easily maintained. The effects of wingtip vortices cannot be underestimated. Whether during formation or flight leader separation takeoffs, sufficient wingtip to wingtip separation must be maintained to ensure avoidance of the vortices, which can wrestle control of your aircraft out of your hands in the blink of an eye.

Third, know the performance capabilities and characteristics of your aircraft. There are very few aircraft that don't give ample indications of impending departure from controlled flight. Know these indications and listen up for them when you are operating at or near the edge of the performance envelope.

Fourth, know when it's time to jettison the reuseable container. The best time to think about ejection situations is in the ready room or at mid-rats with some of your squadron mates.

Listen to war stories. Talk about ejection situations and options around the ship, during ACM or weapons delivery. Determine **now** when "too late" is, not in the air when it is too late. I thought I knew! I ejected outside the published safe ejection envelope, but because my initial vector was into the wind, I am alive today to write this article. Weidmannsheil Kamaraden! Good hunting! ◄

LCdr. Hummel is an F-14 pilot with VF-24.

The NACES Advantage —

Coming Soon to a Cockpit Near You!

"The NACES program is a long-term effort to provide aircrewmen with the most advanced lifesaving technology available."

THE incorporation of the Navy Aircrew Common Ejection Seat (NACES) in Navy aircraft represents a quantum leap forward in ejection-seat design and takes advantage of the latest escape system technology. NACES will provide aircrew with improved chances for escape in all ejection situations, reduced potential for injury, extended preventive maintenance intervals and a significant reduction in the life-cycle costs. NACES will be introduced in F/A-18C/D aircraft scheduled to be delivered in 1990, and all subsequent F/A-18s. After that date, all T-45 trainers, A-6E and F-14D aircraft will be delivered with the NACES installed.

NAVAIR began to develop NACES in late 1983, incorporating unique requirements, including a common ejection seat configuration capable of fitting into all seven candidate cock-

pits without modifications (T-45 [2], F/A-18C[1], F/A-18D[2], F-14D[2]). This commonality reduces the different models of ejection seats currently in the Navy inventory, each of which requires its own peculiar spares, manuals and support equipment.

Based on the lowest unit cost, the lowest projected life costs, and an excellent proposed technical approach, the Martin-Baker Aircraft Co., Ltd., of England, was selected as prime contractor for the NACES development program.

The NACES design incorporates two significant advances in escape systems: a high-speed parachute and on-seat environmental — altitude and airspeed — sensing. NACES also provides multiple attachment points for the drogue parachute for improved stability in pitch and yaw.

The NACES main recovery parachute is a bag-deployed, 6.2-meter aeroconical parachute, a larger version of the parachute used in the current F/A-18 ejection seat, capable of safe deployment at airspeeds of 100 knots greater than present Navy systems. The NACES parachute has been hailed as the most significant improvement in ejection seat technology

since the introduction of the super-fast 0.10-second time delay in the early 1970s.

The goal of ejection seat design is to place the person who ejects under a fully open parachute as soon as possible without injury. The faster this event is completed, the more lives will be saved, especially at low altitude. The timing of the ejection sequence is limited by the structural strength of the parachute and the G forces imposed on the user by the shock of the parachute opening. Current parachutes require a time delay of approximately two seconds at ejection speeds above 225 knots. This delay translates to altitude used prior to ground impact. The longer the wait, the higher the probability of running out of altitude. A soft opening, high-speed parachute significantly reduces the waiting time. In the case of the NACES parachute, the wait penalty is reduced by almost a full second. For an A-6 in a high-speed, 60-degree dive, this reduction means that the crew can eject at 1,000 feet instead of 1,800 feet.

Based upon ejection statistics, the NACES parachute will increase the probability of a safe ejection for at least one out of five users. In a business where progress is measured in reductions of milliseconds, and an increase of 1 percent in the yearly recovery rate is considered a significant victory, an increased probability of 20 percent justifies the cost of the NACES program.

Current military specifications call for a parachute descent rate of 30 feet per second, or less. Historically, this rate has been difficult to achieve. In-progress testing of the NACES parachute indicates that the aeroconical design is capable of significantly lower rates with a corresponding reduction in the potential for landing injuries. Also, tests indicate very little oscillation during descent. The 6.2 meter parachute can also be steered to avoid hazards during descent. For logistical advantage, the parachute is environmentally sealed in a plastic container with a five-year installed life, ensured by an external idicator of seal integrity.

The NACES sequencing system significantly increases the design's reliability, and is the first application of this technology to Navy escape systems. Together with on-seat environmental sensors, it represents the brain of the NACES.

As the seat leaves the aircraft, independent redundant pitot heads deploy mechanically and ballistically on either side of the headrest parachute container. These pitots sense the airspeed. Coupled with static sensors, the sequencer is told the altitude and airspeed of the seat, compares the current input data to the data contained in its look-up tables and selects the

operational mode. The drogue is retained or released, and the main parachute is deployed at the earliest possible moment.

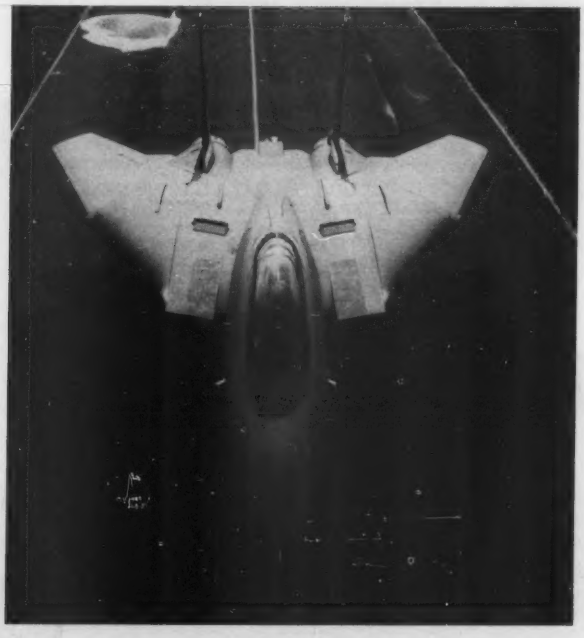
The sequencer is powered by independent, redundant, thermal batteries that are activated by the seat's primary dual hot-gas firing circuits. Either battery will power the system. The sequencer is located directly beneath the parachute container and is easily tested by a portable test set.

The ejection seat's pitch and yaw are controlled during the escape trajectory by a ribbon-type drogue parachute with a three-point bridle attachment to the seat, one upper and two lower. Because of the complexities of three-point releases, seat designs have tended to ignore the advantages of the multiple-attached drogue in favor of directional rockets and mechanical realignment devices.

However, NACES returns to the three-point drogue for positive stability with the three-point release precisely controlled by the microprocessor. The redesign of the traditional Martin-Baker under-seat rocket motor also increases stability. The manifold is relocated to the rear with all rocket fuel tubes located forward, reducing weight for an improved CG-CP relationship and an improved thrust angle for more positive stabilization. Improved seat-man stability will greatly reduce the risk of limb flail, parachute opening shock and yaw-induced internal injuries.

The NACES ejection sequence is begun with the lower handle only, completing such pre-ejection functions as upper torso restraint, and aircraft canopy jettison. Sequence initiation energizes the manual override and automatic backup functions. The occupant is positioned by the power haul-back reel, and the thermal batteries for the sequencer are ignited. The ejection gun is fired.

As the seat moves up the rails, the pitots deploy, the rocket motor is fired, the emergency oxygen and emergency beacon activate, and the leg restraints secure the lower limbs. A mechanical switch is positioned to start the environmental sensing system.



Based on the airspeed and altitude at the moment of ejection, as indicated by the sensors, the optimum ejection functions are selected and performed. At low speed, the drogue is released immediately. At high speed, or high altitude, the drogue is retained. At a safe airspeed, as determined by the microprocessor, the extractor rocket is fired, forcing deployment of the main parachute. Then, the drogue is released. The harness-to-seat connectors release, and the occupant is separated from the seat. The survival kit is retained and the crewman descends under a fully inflated parachute.

All NACES critical functions are backed up by dual, independent systems. All NACES functional systems, including back-up systems, have been verified by design reviews and analysis, and demonstrated by the most extensive demonstration test and evaluation program ever imposed on a Navy escape system.

Prior to introduction into the operational inventory, the NACES design will have been demonstrated through over 2,000 component and subsystem tests, and over 100 full system tests. Component tests include full qualification tests for all ballistics and survival equipment. NACES system tests include in-flight and runway tests from the F-4 flight test vehicle from 90 KEAS* to Mach 0.96, covering the full altitude range and all critical crossover points. Each NACES configuration will be rocket sled-tested to verify cockpit installation and clearance from 0 through 600 knots. NACES will also be subjected to the full MIL-STD-810C environmental test series including vibration, shock, temperature cycling, sand and dust, as well as dynamic 30G acceleration crash testing.

In addition to the above test program, NAVAIRTESTCEN will conduct a technical evaluation of NACES that will include both flight testing and shipboard evaluations, followed by a full operational evaluation by COMOPTEVFOR. At IOC, NACES will be the most analyzed, most tested and most thoroughly documented escape system ever introduced.

In addition to providing an advanced escape system, the NACES program also includes a Pre-Planned Product Improvement Program (P^3I). This program identifies candidate product improvements and the necessary funding requirements to ensure orderly development and incorporation of advances in seat technology. Examples of P^3I programs currently under consideration are:

— An integrated restraint harness to replace the MA-2 torso harness
— Arm restraint
— Sink rate and aircraft altitude sensing

The NACES program is a long-term effort on the part of the Navy to provide aircrewmen with the most advanced lifesaving technology available. The program will control costs by providing continued competition in follow-on seat and component procurements, control the design by Navy ownership of all rights to data, and provide for orderly improvement in lifesaving capability. ◄

Submitted by the Crew Systems Division, Naval Air Systems Command

*Knots Equivalent Airspeed (KEAS) is the flight speed in the standard sea level air mass that would produce the same free stream dynamic pressure as the actual flight condition.

Are You Prepared?

By Cdr. D.C. Kendall

IT was a normal Indian Ocean day: sun shining, light winds and another SSC mission. My wingman and I were assigned different sectors to search. We planned to meet afterward at a prebriefed point to practice our lookout doctrine and air combat maneuvering.

Loaded with a Sidewinder each, we launched in our A-7s and searched our areas for about 45 minutes before heading to the rendezvous point. I got there first and set up an orbit, scanning the horizon for my target. A few minutes later I heard a missile call: Fox 2, A-7 heading east 20,000 feet."

Looking back at my left 7 o'clock, I saw my wingman approaching one mile with high closure. Instinctively I went to full power while banking left and pulling hard into him. I felt a thump, and my A-7 started to increase its roll rate and nose-down attitude. I thought I'd lost a slat or something off

. . . I saw the oil slick below where my plane went in. I decided to worry about the cause of the crash later because I could still drown if the parachute got tangled around me . . .

my wing, so I looked outside. Then I looked back inside the cockpit to check my instruments. They all had off flags, and there was no electrical power. Realizing that I was going downhill at an impressive rate, I reduced the throttle to idle and deployed the emergency generator for electrical power. Nothing happened and my spiral began to get tighter.

I thought I was in a spin, so I put the controls in the anti-spin direction. The stick felt like it wasn't connected to anything. I felt a tremendous lateral-negative G force that took my head from its upright position and put it on my right knee. My vision went from gray to gone in what seemed like a microsecond. I felt my consciousness about to go and instinctively pulled the lower ejection handle.

The next thing I knew I was coming down in the chute. When I opened my eyes, I could not see. The G forces prior to ejection had broken some blood vessels in my eyes, and I was temporarily blinded. I began to review the procedures for water entry. Let's see, "Inflate the rubber duckie."

I found the little toggles, and the LPA inflated with a woosh. I tried to hook the lobes together, but couldn't find either the hook or the ring. It was frustrating, and my back felt tight from the out-of-position ejection. At least I was out of the aircraft, which was probably in Davy Jones' locker by now. I thought about deploying the raft, but it was already out and hanging at the bottom of its lanyard. I unhooked my oxygen mask and finally got the LPA lobes attached. My vision was now coming back.

I began searching for the koch fittings because I was getting close to the water. I saw the oil slick below where my plane went in. I decided to worry about the cause of crash later because I had more pressing concerns like drowning if the parachute got tangled around me.

I put my hands on the fittings and released them when my feet hit the water. That was easy; the parachute just floated away. I headed for the raft, remembering that the divers on the ship wouldn't even go in the water because of sharks, sea snakes and jelly fish. I made it to my raft and was out of the water in a few minutes. I disconnected my seat pan.

Hearing my wingman overhead, I decided to try to call him on the emergency radio. First, I secured the emergency beeper because I was sure he could see me. I pulled the PRC survival radio and found the antenna broken off, so I decided to wave my hand at the wingman on his next pass to let him know I was all right. I pulled in my survival kit and checked what I had available. I discovered a messy, syrup-like liquid all over the pack. I threw the pouch in the water to get rid of it.

What had happened to my aircraft? Had I done anything wrong? I couldn't wait to talk to my wingman to find out if he had seen anything unusual. I began wondering about the rescue helicopter. It should be on the way. I played with the radio antenna some more but couldn't get it to work.

Soon I heard the helo behind me. I tried to remember what those helo guys had said about when to get out of the raft. I thought they said to stay in it because they would put a swimmer in the water, and he would help me puncture the raft.

I decided I would get out when the swimmer got there. This turned out to be a good move because of all the lanyards I had attached. Without the swimmer's help, it would have taken a long time to get untangled. Soon I was hoisted aboard the helo.

During the 30-minute ride to the ship, I worried about what had happened to the aircraft. I still did not know if I had caused the mishap. My back got much stiffer, but I was able to walk. Once on board USS *Ranger* (CV-61), I was escorted to medical for an examination and finally got to talk to my wingman.

"Did you see anything fall off my airplane?" I asked.

He responded in an excited voice, "Yeah, you should have seen it. Flames were coming out the back end. You were on fire. I yelled "Eject!" three times before the back half of your airplane exploded. I thought you were a goner until I saw the chute deploy out of the debris."

I was elated! A mechanical failure, not my error, had caused the mishap. I felt like I just got an OK 3 wire when I expected a cut pass.

My wingman said he couldn't see me in the water until I deployed the first dye marker and that the second one was a great idea. I didn't tell him that I had accidently pulled the only dye marker I had out of the water, trying to figure out what it was, then discarded it again because it was a mess. Then I asked him if he still had his Sidewinder when he landed. He laughed and said that after my airplane exploded, that was the first thing he checked.

Later on, while recovering from my very stiff back, I analyzed my performance and concluded that I was fortunate to have gotten out of the aircraft. The entire incident took 30 to 45 seconds. I decided that I should have known more about my survival equipment. Besides not using my flares or mirror, I almost stopped the dye marker, which had opened on its own. I turned off my beeper because I heard my wingman overhead when, in fact, he lost sight of me much of the time. Other SAR aircraft were having trouble locating me initially because the ship's TACAN was off. Had I left the beacon on for awhile, they could have used it to DF my position. All and all, I was very fortunate. ◄

Cdr. Kendall is assigned to VA-146, an A-7E squadron based at NAS Lemoore, Calif.

The Year in Review

1987 Ejection Summary

By Sharone Thornton

EJECTION seats saved 61 lives in 69 ejections during 1987, an overall survival rate of 88 percent. This rate is a decline from 92 percent in 1986 and the all-time high of 95 percent in 1985 (Table 1). Nevertheless, 88 percent still represents a high rate of survival. A full accounting of 1987 ejections is in the United States Navy Emergency Escape Summary, which is currently in distribution. What most people are interested in are the ejections that resulted in fatalities. In 1987, there were eight fatalities.

Six of the eight people who died in 1987 ejected out of the envelope. Four of them initiated ejection so late that the aircraft impacted the ground or water before the seat left the cockpit. In one case, an S-3 pilot departed his aircraft during

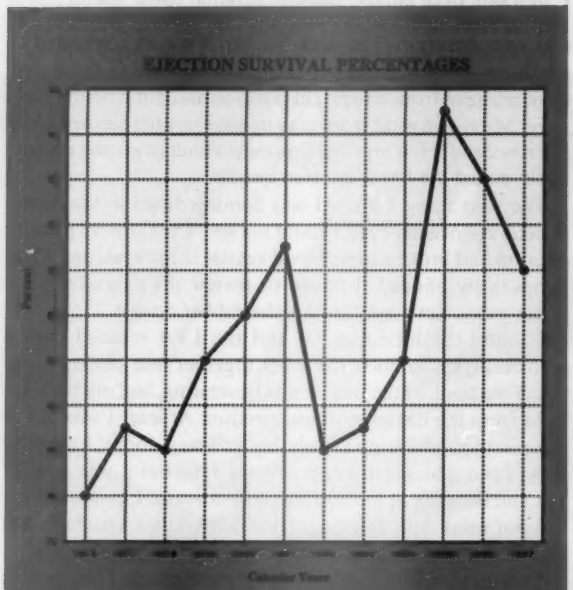
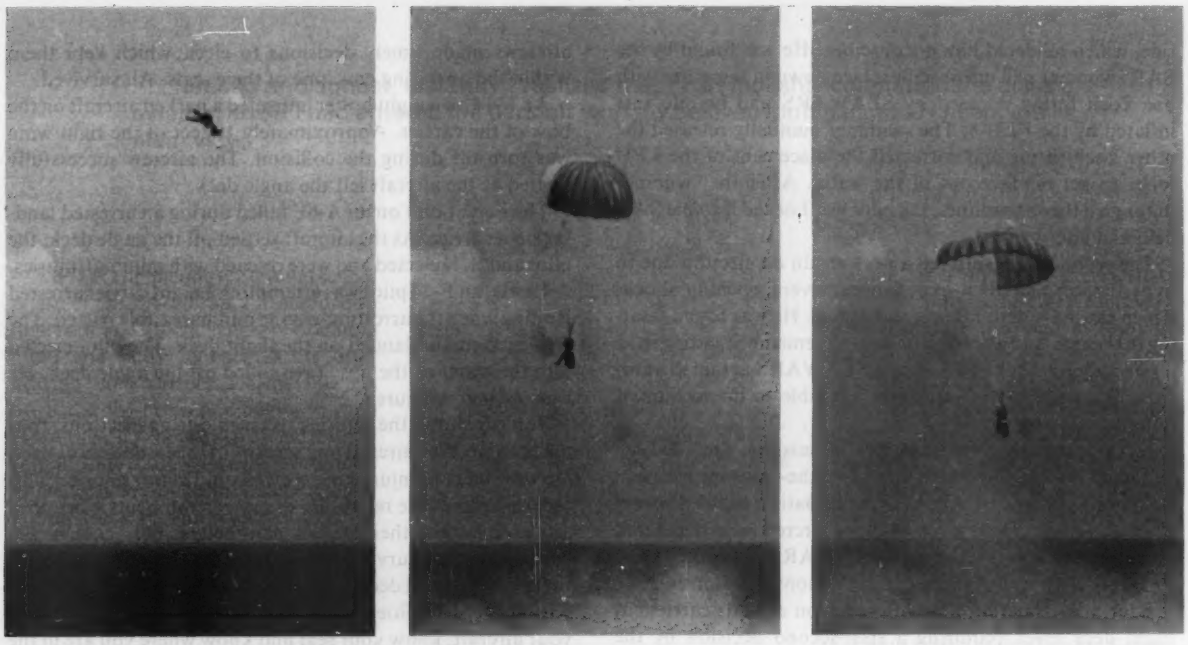


TABLE 1
EJECTION SURVIVAL PERCENTAGES
CY 1978 thru 1987

CY	Jan-Jun	Jul-Dec	Year (Avg.)
1978	81%	78%	80%
1979	74%	91%	81%
1980	86%	85%	86%
1981	82%	95%	89%
1982	92%	68%	80%
1983	79%	85%	81%
1984	91%	81%	84%
1985	96%	94%	95%
1986	92%	93%	92%
1987	85%	91%	88%



low-altitude acrobatics. He called for ejection when he realized he would not be able to recover the aircraft before he hit the water. Both rear seat occupants were ejected successfully prior to water impact. The COTAC's seat (right front) was apparently going up the rails at water impact resulting in fatal injury. The pilot's seat did not have time to clear the cockpit, and he was lost at sea. The time delay between the front and rear seats in command ejection is less than a second. This graphically shows how microseconds can separate success and failure in ejection decisions.

In another mishap, the pilot of a TA-4J pulled the ejection handle at 200 feet, 60 degrees nose down and 160 knots. The rear seat, which was empty, cleared the cockpit, but the front seat did not leave the aircraft prior to impact.

In the final fatal mishap, an F-14 pilot committed his aircraft to a nose-low maneuver during flight demonstration practice. When it was apparent the aircraft would not pull out in time, the RIO initiated command ejection. Due to the high sink rate, the RIO was ejected into the trees, and the pilot's ejection was interrupted by ground impact.

In all three of these mishaps, the pilot was trying to recover from a low-altitude, nose-low, high-rate-of-descent situation. The ejection decision was made at low altitude when it became apparent that the pilot wasn't going to pull it out. In this situation, the ejection seat will only work successfully if given enough time (which equates directly to altitude). If you wait to see if you can pull it out, it may be too late to eject. Knowing your particular seat's envelope and preplanning your low-altitude, high sink rate ejection criteria will save your life. As seen in these mishaps, microseconds can make the difference between life and death.

Only two people died during ejections in the envelope. One was an inadvertent ejection, the first since 1983. A TAV-8A Harrier was making a low-level, high-speed pass at 550 knots when the canopy imploded. The wind blast and/or canopy fragments dislodged the front cockpit face curtain initiating ejection. The pilot was not expecting to eject and was caught out of position. The severe windblast pulled off his helmet, causing hyperextension and a fatal fracture of his neck. Seat separation occurred and the chute fully deployed. Had he been in position, he would have had an excellent chance for survival. His ejection led to an out-of-the-envelope ejection for the rear-seat occupant. He was not a pilot and, unable to control the aircraft, initiated ejection approximately one second before impact with the ground. He did not get seat separation before hitting the ground and did not survive.

The final ejection fatality that was in the envelope occurred to an A-6E pilot. The pilot ejected successfully and made it into his raft, but was not recovered for 16 hours and died of severe hypothermia.

The overwater survival rate for 1987 was 90 percent. The rate was 94 percent in both 1985 and 1986. Despite the slight decrease, 90 percent still represents a very high rate of survival in the water, traditionally the Navy's "Achilles heel" for survival following ejection. No drownings occurred in 1987. One pilot (the S-3A pilot previously mentioned) was lost at sea when his seat did not leave the cockpit and was lost with the aircraft. It was the first lost-at-sea fatality since 1983.

The FLU-8 automatic life vest inflator and SEAWARS automatic parachute-release system continued to demonstrate their life-saving capabilities in 1987. The combination was credited with saving the lives of two pilots.

One pilot was at the controls of an EA-6B that developed an excessive rate of descent in the carrier landing pattern. Command ejection was initiated, and all seats left the aircraft. The pilot was last in the sequence and suffered a more violent

ride, which rendered him unconscious. He was found by the SAR swimmer still unconscious, face down in the water with one koch fitting released by SEAWARS and his life vest inflated by the FLU-8. The swimmer manually released the other koch fitting and corrected the placement of the LPU lobes to get his face out of the water. After the swimmer untangled the shroudlines, the pilot was hoisted into the SAR helo and later revived.

The second pilot suffered a neck strain on ejection due to hyperflexion and then experienced severe opening shock, which caused him to lose consciousness. He was found floating in the raft, and although he doesn't remember getting in, it is concluded that the FLU-8 and SEAWARS actuated automatically since he was apparently unable to do so himself initially.

In the previously mentioned S-3A mishap, the COTAC suffered fatal injuries due to his out-of-the-envelope ejection, but the FLU-8 and SEAWARS combination enabled recovery of his body. There were 14 other aircrew who benefitted from actuation of FLU-8 and SEAWARS since they were unable to accomplish the necessary actions themselves.

Each year, aviation mishaps occur on aircraft carriers at flight deck level, requiring a split-second decision by the aircrew to either eject or ride the aircraft into the water. This year, three aircraft were involved in carrier deck-level emergencies involving such a decision. In all three aircraft, the aircrews made timely decisions to eject, which kept them within the operating envelope of their seats. All survived.

An F-14 on a night bolter impacted a parked aircraft on the bow of the carrier. Approximately 10 feet of the right wing was torn off during the collision. The aircrew successfully ejected as the aircraft left the angle deck.

The hook point on an A-6E failed during an arrested landing on a carrier. As the aircraft settled off the angle deck, the pilot and B/N ejected and were rescued with minimal injuries.

Lastly, an F-14 pilot was attempting a night carrier arrested landing when the arresting-engine purchase cable parted. The RIO ejected and landed on the flight deck. The pilot ejected into the water as the nose tires rolled off the angle deck. He was rescued uninjured.

Table 2 shows the injuries received during ejections; they are listed by type aircraft and severity. Three-quarters of these aircrews were uninjured or received only minor injuries. This fact underlines the reliability of our ejection seats when they are used within their design parameters. Our goal is 100 percent ejection survival. We are getting close, but we're not there yet. Delayed decisions to eject were the primary cause of 75 percent of fatalities in 1987. The only protection is to know your aircraft, know your seat and know where you are in the envelope, especially at low-altitude where you cannot delay your decision to eject. And if you must eject, do it without delay. ◄

Sharone Thornton is an escape systems analyst in the Aeromedical Division of the Naval Safety Center's Aviation Safety Directorate.

TABLE 2
INJURY CLASSIFICATION ACCORDING TO TYPE AIRCRAFT CY 1987

Type Aircraft	January–June					July–December				
	Total	Fatal	Major	Minor	None	Total	Fatal	Major	Minor	None
A-4	1	–	–	–	1	2	–	1	1	–
TA-4	5	–	–	1	4	3	1	–	–	2
A-6	4	1	1	–	2	7	–	2	–	5
EA-6B	3	–	1	2	–	–	–	–	–	–
A-7	1	–	–	–	1	4	–	–	1	3
F-4	3	–	–	–	3	3	–	–	2	–
F-14	6	2	1	1	2	8	–	1	2	5
F/A-18	5	–	–	1	4	5	–	–	3	2
S-3	4	2	2	–	–	–	–	–	–	–
T-2	1	–	–	–	1	–	–	–	–	–
AV-8	2	–	–	–	2	2	–	–	–	2
TAV-8	–	–	–	–	–	2	2	–	–	–
Totals	34	5	5	5	19	35	3	4	9	19

. . . Reeling and aghast, instantly I realized that I had foolishly committed the classic aviation error. I had entered the paraloft with my beloved multigadgeted kneeboard in plain view. . .

The PR That Ate New York

By Lt. Anthony Padgett

AFTER completing the ground school phase of the EA-6B rag, I proceeded to flight side and the challenges of orienting mind and body to cockpit life after nearly a year's absence. The major layers of rust in my brain had begun to yield after the first few instrument round robins. Due to the exceptional culinary influence of my highly motivated spouse, my jet jeans (G-suit) were in need of some minor adjustments. Innocently, I breezed into the paraloft one afternoon to request a fresh fitting.

There I encountered a creature with huge hairy palms, steam snorting from his nostrils and sewing needles neatly in his forehead (complete with heavy green thread). I instinctively knew that I was in for more than a fitting. Sensing danger, I made every effort to remain as small as possible. Then, without provocation, it spoke. "Nhee-board!" it demanded. "Nhee-board!" Reeling and aghast, instantly I realized that I had foolishly committed a classic aviation error. I had entered the paraloft with my beloved multigadgeted kneeboard in plain view.

No one could save me or my beloved kneeboard now. Springclips ricocheted around my head. Pieces of black plastic knob danced across the table. Twisted batteries fell to my feet. The wire pencil clip? He ate it. With the subtlety of a head-on collision, my government-issue kneeboard had been reduced to a mangled, twisted, FOD-free appendage. He growled loud and angrily. His face contorted and his hair changed colors. He had discovered the loose-leaf rings that now held shredded remains of NATOPS checklists. The absence of "shrink link" boiled his primal blood. "Ink-ink!" he screeched. "Ink-ink!"

I understood. Reaching the toolroom, I did not need to explain. They recognized his work. After treating my various cuts and bruises, they carefully applied the heat shrink sections to each binder ring and then helped me to my feet. So ended my encounter with the "PR that ate New York."

Months later, the episode being long but not easily forgotten, our crew launched from USS *Ship* in heavy weather for a night war-at-sea strike. Upon returning to the CV, we found the weather had deteriorated to one-sixth of a mile in fog. We were bingoed along with half of the air wing to NAS Hometown. Being new to CV flying and having minimal front-seat Prowler time, I was finding plenty of challenge and excitement. Once safely on deck with the approach plates, bingo charts, high-altitude charts and various supplements neatly restowed, I noticed a glaring hole where one of the cockpit-safe, heat-shrink-equipped, loose-leaf, rings had (not unlike Houdini) escaped. Frustration and embarrassment aside, the heat-shrink problem had now escalated to threaten the safety of our aircraft and crew.

Fortunately, the ring was not in the cockpit, but the amount of grief these little units can cause is plain to see. When I inspected the remaining kneeboard rings, I saw a loose fit on other shrink link fittings, which allowed them to slide away from the interlocks and become useless.

Like so many aspects of naval aviation, kneeboard FOD is an area where 10 minutes of preventive maintenance will stop both unnecessary maintenance headaches and major aircraft mishaps. Don't trust your safety to the good-deal fixes of your PR shop until you have carefully inspected your gear and are personally satisfied that it can stand up to the most strenuous use and still remain intact. Allow a few minutes to look over your nav bag and other flight gear as part of your preflight. Anything that can come loose will, and probably at the worst possible time. Minimize cockpit gear, and securely fasten it where possible. Remember: The final responsibility is one thing that never slips out of *your* hands. ◄

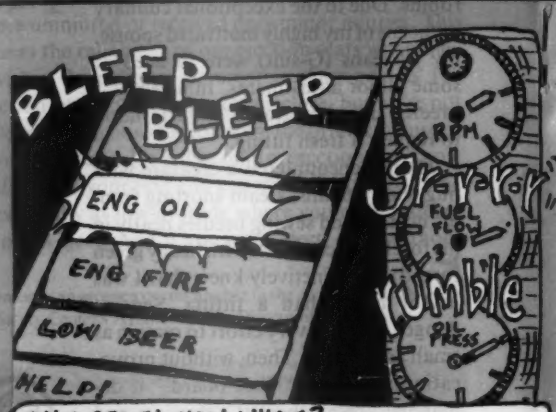
Lt. Padgett flies with VAQ-132, based at NAS Whidbey Island, Wash.

AVIATION SAFETY COMIX

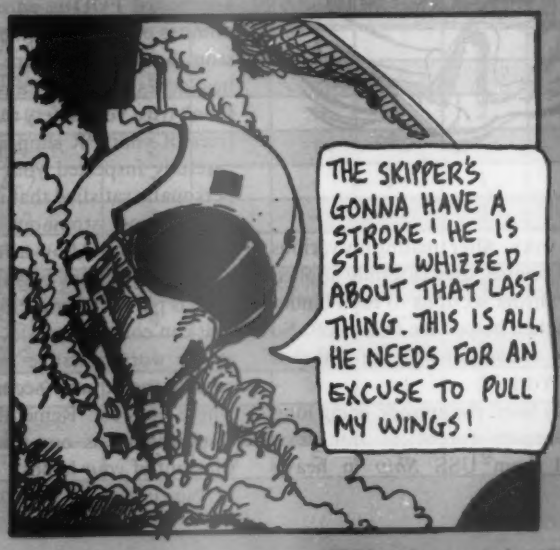
Decision to Eject

By Lt. T.J. Wheaton
NAS Key West, Fla.

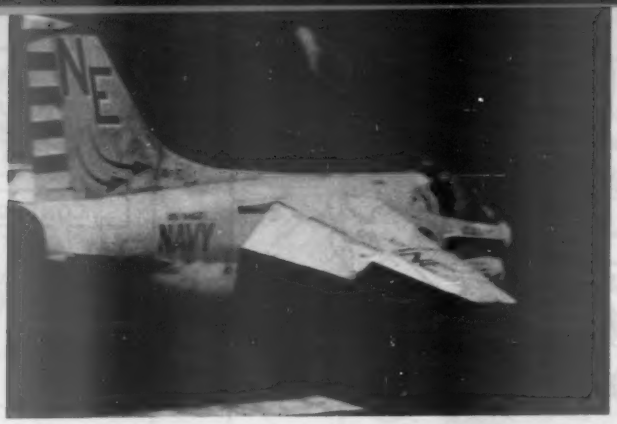
* NO "BITCHIN BETTY" IN THIS AIRCRAFT. AUTHOR HAS ALWAYS WANTED TO SCREAM AT ONE, THOUGH.



OH GREAT! NOW WHAT? OH NO. RPM, DOWN! NO OIL PRESSURE. FUEL FLOW, UP!! I CAN'T BELIEVE THIS HAPPENING TO ME. (GULP): I'M TOO GOOD FOR THIS. NO, THIS IS NOT HAPPENING. NOPE. NOWAY. NOT ME.....




GEARUP, FLAPS UP.... TODAY, DANGERBOY, YOURE GONNA GET YOUR'S !! (HEH-HEH)
GULP!
SCREEEE
TIME TO DO....
GRUNT
...CONTROLABILITY...
GRUNT
GRUNT
CHECKS.
GRUNT!
NO WAY AM I PUNCHIN' OUT! GOD, I KNEW IT! I SHOULDA WORN MY DRY SUIT AND THAT WATER LOOKS COLD. MAN, I JUST KNOW EJECTION IS GONNA HURT....
I BET THIS IS MY FAULT! IM GONNA GET THE BLAME. GEEZ, IF I EJECT, THERE'LL BE A JAG and A MISHAP BOARD, THEY'LL DRAW BLOOD. THEY'LL KNOW I WAS DRINKIN' TILL LATE LAST NIGHT.....
EH, DATS THE TICKET, AND THEN ILL GET MY NAME IN APPROACH, FOR A BRAVO ZULU. YEH, SHOW 'EM HOW IT'S DONE. YEH. A BRAVO ZULU KIND OF GUY!! SUPERIOR AIRMANSHIP!!
I'LL PROBABLY GET AN AIR MEDAL FOR THIS. YEH. PRESENTED BY THE CAG. YEH! NO. NO. BY CNO OR MAYBE THE PRESIDENT. YEH THAT'S THE TICKET!.....
PRANG!
YEH.... THATS A ONE WAY TICKET. DELAYED AND 'OUT-OF-THE-ENVELOPE' EJECTIONS ARE THE #1 CAUSES OF EJECTION FATALITY. MAKE YOUR DECISION ON THE DECK, NOT IN THE AIR, AND.... KNOW WHEN TO GO!
T.J.W.



Approach's July front cover showed an A-7B leaving the flight deck with the pilot ejecting, his canopy flying in the air. Some readers have been curious about what happened after that.

It was easy to find the answer because the pilot works at the Naval Safety Center, where Approach is published. His name is listed monthly on our masthead: Capt. J.J. Fleming, Chief of Staff.

Over the Edge

By Capt. J.J. Fleming and Bud Baer

IT was May 9, 1970; he was operations officer for VA-93 in CVW-2. Capt. Fleming was returning from a daytime combat mission over North Vietnam to the USS *Ranger* (CV-61) on Yankee Station in the Gulf of Tonkin. He had successfully dodged AAA and SAMs to deliver his ordnance on target. Little did he know that the most exciting part of his hop was about to begin.

He led his four-plane formation into the break, but waved off on his first pass because of a fouled deck. On his second pass he caught the No. 2 wire and advanced power to MRT (military-rated thrust). As he felt the familiar deceleration on his rollout, he retarded the throttle to idle and raised the hook handle. Anticipating the end of the rollout, he began to advance the throttle and reached for the wingfold lever with his right hand.

"The aircraft lurched almost like a rubber band snapping," Capt. Fleming recalled. "My first thought was that the arresting gear had parted, so I reduced the throttle to idle and clamped hard on both brakes, feeling that I had enough flight deck to stop. The A-7 continued up the angle.

"I could hear the LSO yelling, 'Brakes! Brakes!' on the UHF. I felt the brakes getting softer under my foot pressure. I realized they were heating up so I engaged nosewheel steering to try to steer the aircraft right, up toward the bow. But with both legs locked firmly out in front of me holding the brakes, I never did get enough pedal throw to turn the aircraft. As we approached the deck edge, I still felt I would stop in time. But suddenly all I saw ahead of me was water, and I knew I was going over the side.

"As I considered the question of which handle to pull, my hands instinctively reached for the face curtain and pulled it firmly forward."

Capt. Fleming was not in the best body position for ejection. Both his feet were firmly on the brakes with his legs straight out in front of him. His torso was pushed well back against the seat while his head was bent slightly forward as he looked at the water.

"First I saw darkness as the face curtain blotted out the bright sun," he related. "Then I heard a loud bang and felt a jolt. From then on it was exactly like a wild carnival ride. I felt as if I somersaulted three or four times and was going in six different directions at once. I distinctly remember seeing the ship upside down, then the sea, the sky and the ship all whirling past me in a hectic but clear pattern."

. . . "As we approached the deck edge, I still felt I would stop in time. But suddenly all I saw ahead of me was water, and I knew I was going over the side" . . .

He did not remember releasing the face curtain or the seat separation. He found himself cartwheeling through space with his arms and legs flailing.

"As I felt the jolt of the ejection seat starting to move, I thought, 'I'll make it. This is the best seat in the fleet,' " Capt. Fleming said. "But I remember thinking after gyrating like a human cannon ball, 'Well, this isn't right. I've only got 60 feet. Am I connected to the chute?' Just then, the chute opened with a mild shock, and I swung through the vertical, looking at the ship, feeling relief and searching frantically for my LPA-1 toggles. I found the left toggle, but I didn't pull it because I knew I should pull the right one first, or preferably, both simultaneously."

Then his feet hit the water. He still couldn't find the right toggle, so he pulled the left one. Water entry was mild. He went under only a foot or so.

"I then found myself floating tilted to the right side with my feet up and my face in the water," he said. "Breathing was difficult, and I realized I still had my oxygen mask on. I pushed the mask firmly against my face with my right hand and took two deep breaths of oxygen. Then holding my breath, I unhooked the mask from the left side and began to fight to keep my head above water.

"My attempts to get my feet below me, which I felt would keep my head above the swells, were frustrating and unsuccessful. This was partly because my left foot was tangled in the chute shroudlines."

The bulk of his survival vest was under his arms and greatly restricted his reach. When he drew his feet up, he could grasp the shroudlines, but he could not reach far enough to loop them over his feet to free himself. When he tried, he would go under water about every third swell. This complicated his problems drastically since each time he had to stop trying to untangle the shroudlines and fight to get his head back above water.

"It seemed to me as if all my buoyancy was up under my left arm and feet," he stated. "I was floating bent in a U-shape, my mouth and my shoelaces at water level. I stopped trying to untangle myself and set some priorities: first, release the chute and second, release the seat pan.

"With increasing panic I found that with my soggy flight gloves on I could not locate either the koch fittings or the rocket jet fittings. At this point the possibility of drowning seemed very real, so I decided to try to relax and float by lying back and taking some slack out of the 'U' while waiting for the helo. This maneuver promptly submerged my head as my body rolled to the right. Now I was scared!

"I forced my head out of the water and saw the helo above me to my right. 'Oh, God,' I thought, 'please put someone down here to help me.' Immediately I felt a hand on my shoulder — that's fast service! Crazy as it may sound under the circumstances, my first impulse was to shake the swimmer's hand and thank him. He told me to relax and inflate my LPA. Only then did I realize that I had never pulled the right toggle. I found it and pulled. This promptly cured my list, and it seemed to buoy my head up, too."

Capt. Fleming told the swimmer that his left foot was caught. The swimmer submerged and worked to free it. Feeling much better now, Capt. Fleming leaned back and meticulously pulled off his nomex flight gloves and threw them away. Then he reached down and unbuckled his seat pan on the first attempt. With his foot freed, he floated upright. The swimmer released his koch fittings, untangled a shroudline from his right foot and pushed him away from the floating chute.

The helo, dragging a horsecollar through the water, was now almost overhead. His helmet visor protected his eyes from the stinging spray. Remembering his deep water survival training, he turned his back to the spray and push-paddled toward the horsecollar. The swimmer got to the collar first and towed it to the pilot. When they were both hooked up, they were hoisted aboard the helo and flown back to the CVA.

After his mishap in 1970, Capt. Fleming made the following recommendations:

- If you eject, make a conscious effort to hold your elbows and arms close to your body to prevent flailing.
- Get your flotation gear fully inflated before attacking other problems. You can work much more efficiently with your head above water.
- Reduce the amount of gear you have in your survival vest, if possible. Reducing the bulk of this gear, which is pushed up under your arms by the flotation bladders, will greatly improve your mobility in the water.
- Don't try to help the swimmer. You only get in his way. He's trained, competent and not nearly as "shook up" as you are.

These recommendations still hold true today, 18 years later, Capt. Fleming says. He would increase water survival training to at least once per deployment, he explains, because "it pays off in big dividends and lets the aircrew know what to expect." The problems he had when he ejected would have been solved today with the FLU-8 automatic life vest inflator introduced in 1980 and with the SEAWARS automatic parachute divestment device introduced in 1984.

Capt. Fleming had great praise for the swimmer. "If the swimmer had not performed in such a cool, professionally outstanding manner, I probably wouldn't be here today," he says. ◄

Capt. Fleming is chief of staff for the Naval Safety Center. He has flown the A-4B with VA-125, VA-155 and VSF-1; the F-100 on exchange duty with the Air Force; the A-7B with VA-122 and VA-93; and the A-7E as CO of VA-66.

Bud Baer is a staff writer for Approach magazine.

Shot Down in the Atlantic,

or How I carried Out a Perfect 90-Degree Intercept on a SAM

By Squadron Leader Ian Mortimer, Royal Air Force

The Argentines and British fought an intense little war in the South Atlantic in 1982. From April to June, their forces clashed to contest the Argentine invasion of the British-owned Falkland Islands. The fighting was, at times, bitter and bloody, and gave an opportunity to test new weapons systems and tactics.

The British Forces were hard pressed due to limited resources, long distances involved and frequently inhospitable weather.

The air-to-air war was intense and very one-sided. Only one British aircraft was shot down in air-to-air combat, but at least six were lost to surface-to-air missiles (SAMs) and groundfire.[1] Then-Flight Lieutenant Ian Mortimer, RAF, was on exchange duty with the Royal Navy's 801 Naval Air Squadron (NAS) embarked in HMS Invincible when he was shot down on June 1 by a Roland SAM seven miles south of Port Stanley. Here is his story, reprinted through permission of Air Clues, the Royal Air Force Magazine.

FIRST of June 1982 was a typical day in the South Atlantic — cold, wet and miserable. Where on earth the media took all those shots of soldiers yomping through sunny days beats me — it was always cold, wet, miserable and invariably foggy.

The sortie was part combat air patrol (CAP) and part Armed Recce. Part CAP because we hadn't stopped the C-130s getting into Stanley, and part Armed Recce because the Army had taken Darwin, and their next move was to come up the road between Stanley and Darwin. I was cruising on an east-west race track south of the road, occasionally sweeping out of the sea with the "Old Cloth Cock" (Blue Fox radar), looking for C-130s, but mainly looking along the Darwin-Stanley road for anything that might hassle the boys on the ground. And I was, of course, always out of range of the SAM system at Stanley. Oh, yes, I knew it was there. But more in a moment.

My No. 2's weapons system had checked out unserviceable after takeoff, and he'd gone back to have the aircraft fixed (one of only three sorties lost in almost 600 launches). So, there I was on my own at 13,000 feet, 8 kilometers south of Stanley and out of range of the SAM site. I knew I was out of range because we had good intelligence on the subject. *Interavia* Magazine (or was it IDR?) said that the SAM system at Stanley had a maximum range of 6½ kilometers and a ceiling of 13,000 feet, and a German magazine translated by the Senior Pilot on 820 NAS agreed; so it must have been true.

Back to the sortie. I'd been along the road to Darwin twice and was just to the southeast of Stanley, starting a third run, when I was locked-up by a "Pulse India" radar from the general direction of Stanley town. I'd been locked-up on the previous two runs, but as I was out of range of the SAM, I wasn't concerned. In fact, my mind went back to a short monologue I'd heard a couple of days previously when one of the other pilots at 18,000 feet directly over Stanley, had had a SAM fired at him. It went something like this:

"I think they've fired a missile at me. Yes, I can see a missile way. Here it comes — it'll never reach me. It appears to be levelling off. Yes, there it goes, falling away."

It was then that I saw an aircraft taxiing on the runway at Stanley Airfield. Could this be a Pucara about to go and hassle our troops on the ground? A bit of cloud drifted in the way, so I dropped to 10,000 feet and moved a little closer — but still outside 6½ kilometers — to take a better look. A bright flash to the south of Stanley town drew my attention away from the airfield. It was just as if someone had shone a giant mirror at me. And then I picked it up — a light grey smoke trail, already at about 2,000 feet, and coming rapidly my way. Now, how did it go?

"I think they've fired a missile at me. Yes, I can see a missile coming my way. Here it comes. It'll never reach me. It appears to be levelling off."

In fact, about 2,000 feet below, I could see the missile clearly, and it appeared to be almost horizontal. As it disappeared underneath, I rolled left to watch it fall away into the sea.

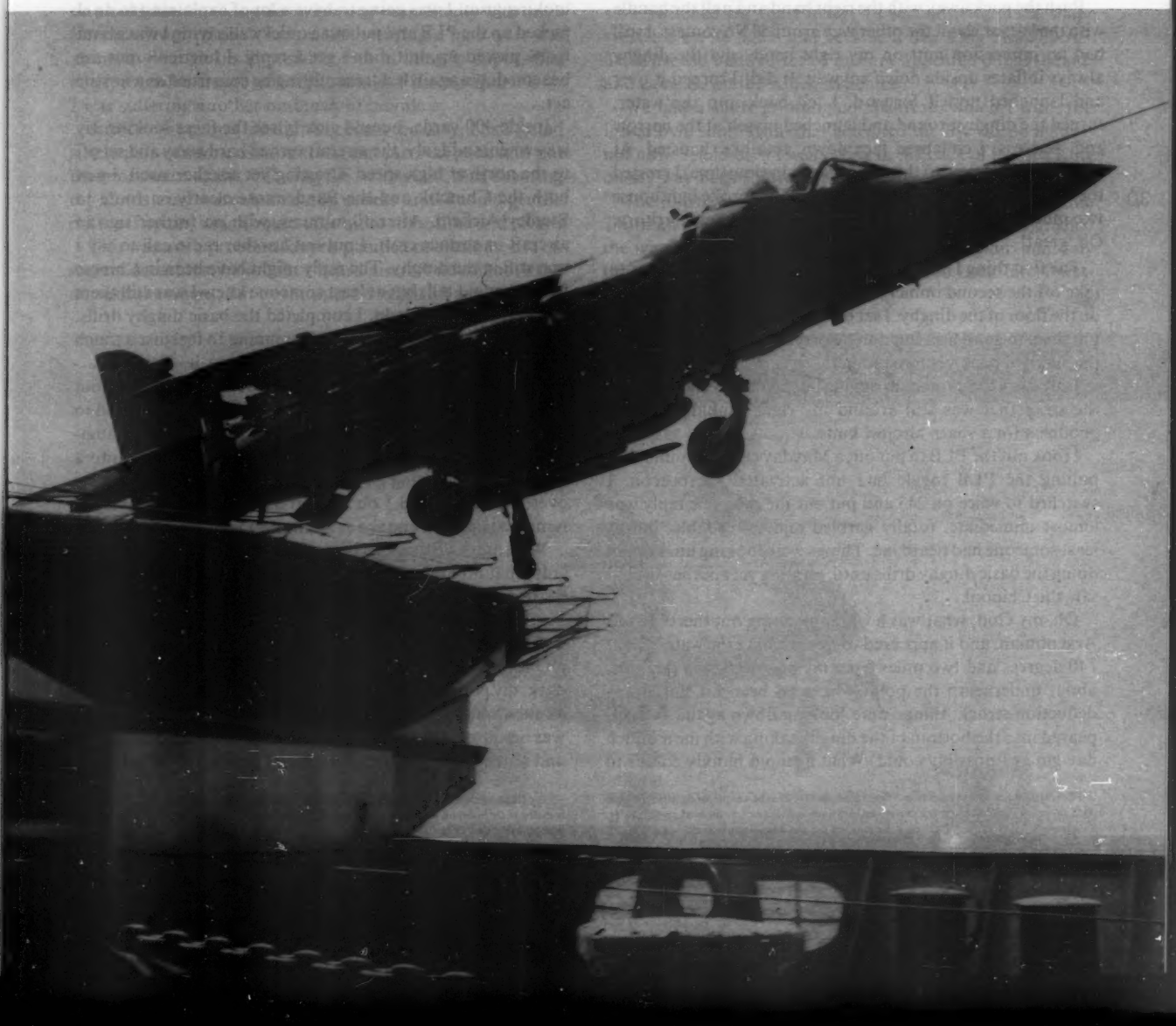
The violence of what happened next is indescribable. I only remember that my overriding impression was one of doing front somersaults under extreme G. Being a bright lad, how-

[1] A Westland Scout helicopter of Three Commando Brigade Air Squadron's "M" Flight was shot down by an Argentine Pucara ground attack aircraft on May 28 while the Royal Marine helo was engaged in medevac duties.

ever, I quickly assessed the problem and came to the conclusion that not only was I not in control of the situation, I wasn't in control of the aircraft. I pulled the handle. The violence continued, and for one horrible second, I thought the seat hadn't fired. But then, just as suddenly as my world had turned upside down, I was hanging in a parachute. The violence of the ejection had been indistinguishable from the missile impact.

Immediately into the post-ejection drills. First, check to make sure the chute hasn't candelled. What bloody chute? I couldn't see a chute. Still, it had to be there; I was floating quite peacefully. OK, on to the next bit. "MIRQ." Mask off — easy. Inflate life jacket — should I have done that at this height? Seems OK. Release PSP (personal survival pack) — not too difficult, and turn the QRB (quick release box) through 90 degrees. Not at this height you don't. Now what? Still another 10,000 feet to go. I put on my immersion mitts — somebody had told us that when 1(F) Squadron flew over northern Norway, they always carried immersion mitts sticking out of the knee pockets of their immersion suits so that if they ejected, they could quickly put on their mitts, thereby protecting the use of their fingers in the Arctic waters. Well, it seemed like a good idea at the time. I put on the mitts and inflated the wrist seals. What next? Oh, yes, set off the whacky new PLB (personal locator beacon). Just pull the . . . just pull the . . . just take off one of the immersion mitts and pull the toggle. Now, how about a little refamiliarization on the PSP, good idea. Just haul up the . . . Oh, damn! Just take off the immersion mitts and haul up the dinghy pack. Good, that seems OK. No snags there. Now, what about those rocks (Wolf Rocks) I seemed to be tracking towards? How about steering the parachute? Steer it? I can't even see it. And if I could, I still had those stupid immersion gloves on! (Oh, yes, I kept putting them back on!)

Even if you have never parachuted you will have heard that in the last 1,000 feet or so, the surface rushes up at you. Boy, does it! It was definitely time to turn the . . . time to turn the . . . time to take off the stupid immersion . . . CRASH! I hit the water with my left hand (complete with immersion mitt) fervently trying to turn the QRB, and my right hand tucked under my left arm trying to pull off the other immersion mitt. This is not the landing posture taught by the P Ed O (physical



education officer). Furthermore, how can one come down vertically from 10,000-plus at 25 feet per second, and still land horizontally face downwards?

I surfaced, wrenched off the left immersion mitt and turned and pressed the QRB. The parachute stayed where it was. Worse, it stayed where it was and wrapped its rigging lines around my right leg. I'm not absolutely certain that it then started to sink, but wherever it was going, I didn't want to go.

I turned my attention to the personal survival pack that was floating upside down 10 feet away. I felt for the lanyard by my left side but couldn't find it. I tried to scoop the cord out of the water in front of me but couldn't reach it — bloody refraction. I swam to the dinghy pack towing the parachute with me. This bit was going to be crucial; Mike Broadwater had ejected a few days previously, and his dinghy hadn't inflated.[2] I turned the pack over. Damn! Where was the bloody handle? I stopped panicking and re-assessed. Something else was wrong. The closure flaps had come undone and were floating in the water either side of the pack. I grabbed the nearest flap and pulled it out the of water. Thank goodness, there was the handle under the flap. Now how did it go?

Push the pack away with the right hand and pull the handle with the left, or was it the other way around? No contest. I still had an immersion mitt on my right hand, and the dinghy always inflates upside down anyway. It did! I turned it over and launched myself forward. I fell back into the water, turned the dinghy around and launched myself at the narrow end. Success. I collapsed face down, totally exhausted. At long last, I had time to think things out in slow time. I crested the top of a 20-foot swell and saw Cape Pembroke lighthouse two miles to the north. Two miles from enemy-held territory. Oh, great!

The first thing I did, having sat the right way round, was to take off the second immersion mitt and, finding the first one on the floor of the dinghy, I sat on the pair of them. At least I'd put them to good use. But don't worry, there's another pair in the survival pack yet to be found!

I cut away the parachute rigging lines from my right leg and the strap that was still around my right shoulder. Thank goodness for a sharp aircrew knife.

I took out the PLB to put out a Mayday call and found that pulling the PLB toggle had not activated the beacon. I switched to voice on 243 and put out the call. The reply was almost immediate, totally garbled and unreadable, but at least someone had heard me. Things were looking up. I began doing the basic dinghy drills until, cresting yet another swell, I saw the Chinook.

Oh, my God, what was a Chinook doing out there? It was Argentinian, and it appeared to be searching the water about 240 degrees and two miles from my position — in fact, just about underneath the point where I'd been hit. Lightning deduction struck; things were looking down again. I disappeared into the bottom of the dinghy taking with me as much day glo as I possibly could. What a stupid bloody colour to use for making dinghies — didn't anyone know there was a war on?

I put out another call on 243 to say the enemy was looking for me, but there was no reply. I toyed with the idea of reaching for the Browning 9mm that was inside my immersion suit, but then I toyed with the idea of not being so stupid and leaving the heroics to the strange people who are trained for that sort of thing. It was then I noticed I was no longer alone.

What had become a couple of curious seagulls had become a dozen or so seagulls, several varieties of ocean-going duck, and even my very own albatross. They thought I was fishing! We were beginning to stand out like a Belisha beacon. I politely asked the birds to go away, but they refused. I was about to ask them again when I saw the next problem; a Bandeirante had joined the search.[3]

The newcomer was covering the area at a much greater rate. Worse than that, he was coming in my direction. In fact, it was pointing straight at me. The Bandeirante flew overhead at 200 feet and then broke sharply away. As it did so, the Chinook turned and pointed straight at my position. The situation was looking grim. I was going to have a lot of explaining to do. I picked up the PLB and put out a quick call saying I was about to be picked up, but didn't get a reply. I hurriedly put the beacon down again lest transmitting be construed as a hostile act.

Inside 400 yards, I could clearly see the faces looking my way when, suddenly, the aircraft turned hard away and set off to the north at high speed. Cresting yet another swell, I saw both the Chinook and the Bandeirante clearly en route to Stanley Airfield. After 10 minutes, with no further sign of aircraft or surface craft, I put out another radio call to say I was still in the dinghy. The reply might have been in Chinese for all I could tell, but at least someone knew I was still there and still in need of help. I completed the basic dinghy drills, took a seasickness tablet (I was beginning to feel just a touch queasy) and settled down for a long, cold wait.

The seasickness tablet had worked well, and I'd baled out nearly all of the water, but I was still very cold. I decided to put more air in the floor of the dinghy to improve the situation. Despite drifting away from the lee of the land into a 20-foot sea and being goffered (drenched by waves breaking over the raft — Ed.) on numerous occasions, the dinghy remained upright, and the extra insulation proved invaluable.

With only two hours to go until dark and believing (mistakenly) that no one would be looking for me so close to enemy territory during daylight, I elected to remain radio silent. Furthermore, there was still every likelihood that the enemy would be back, either by aircraft or boat, and I had no intention of helping them to home onto me. When it became dark, my policy was to put the PLB to beacon for two minutes and then transmit on 243. If I didn't get a reply, I assumed it was because there was no one in the area, so I shut down again and repeated the procedure at what I guessed to be half-hour

[2]LCdr. Mike Broadwater ejected from a Sea Harrier on May 29 as he was preparing to launch from HMS *Invincible* in bad weather. The ship turned hard starboard to come into the wind, sending LCdr. Broadwater's aircraft sliding off the deck. He punched out and was quickly rescued. — Ed.

[3]The Bandeirante is a small twin-engine turboprop airliner manufactured in Brazil. Although not included in the inventory of Argentina's *Fuerza Aera Argentina (FAA)*, this particular Bandeirante was probably part of the *Escuadron Fenix*, a quickly assembled unit of civilian aircraft used in secondary roles such as communications, and especially SAR. — Ed.

intervals; for some reason, my watch had stopped about the time I ejected. Unbeknown to me, the lead from the PLB to the aerial had taken in water, and apart from the two earlier transmissions that had produced replies, none of my transmissions were going out.

The next major problem was where to stow the kit I needed to have immediately available in case help should pass nearby, i.e. PLB, miniflares, day/night flare and Firefly Strobe. Maintaining as low a profile as possible meant the only pockets I had of any use were the downward-facing knee pockets of my immersion suit. A pleasant surprise was the pocket on the left side buoyancy chamber wall, which I hadn't seen before and which was just big enough for the miniflares and day/night flares. Even so, I had to cradle the PLB between the lobes of my mae west for the whole period, and on one occasion, I dropped it into the dinghy where it got a bit wet.

I had now been at sea for several hours, and the effects of the mandatory two cups of coffee that every Harrier pilot drinks before flying were beginning to tell. This was going to be difficult. It's hard enough to stand up in an immersion suit on a cold day, but lying down in a one-man dinghy with one's knees in front of one's face whilst wearing a mae west was going to be nigh-on impossible. But nothing is impossible, and integral balers are wonderful things. Fifteen minutes later I was suffering another outbreak of morale.

Just to ensure that life didn't become too easy, I had found a new pair of immersion mitts in the survival pack and put them on, once again, inflating the wrist seals, thus ensuring my hands were warm but totally useless until I could get the mitts off again, which could take quite some time and effort.

This was not a problem for pre-planned operations, but on several occasions, I thought I heard aircraft noise above the noise of the waves. But by the time I'd taken off a mitt, pulled the canopy open and held my helmet away from my left ear, there was nothing but the sound of the sea, and using the PLB failed to raise a response.

During these maneuvers, I encountered another problem that I had never experienced before or since: Every time I bent an arm beyond 90 degrees, I had severe cramps in my thumbs, which folded over double and failed to operate in the required manner. Not only did it hurt, but it made operating the PLB very difficult, and I could only unlock them by pushing them open one at a time with the palm of the other hand.

Eventually, after nine hours and feeling very cold, I definitely heard the noise of an aircraft. I pulled the canopy open and there, about a half a mile away, I could see the dark shape of a helicopter. (Unbeknown to me, the crew had already seen the shape of my dinghy even though I was not showing any light, and were coming back for a second look.) I pulled out the PLB and muttered something friendly into it. At last, it leapt into life. Totally garbled and unreadable, but at least it was life.

I asked it if I should show a light, and it answered in Chinese. China sounded a lot better than the South Atlantic, so I switched on the Firefly. In seconds, the dark shape switched on its lights and became a Sea King of 820 NAS. Then my old buddy Mark Finucane appeared out of the side and came down the winch to get me.

We had a short grinning competition, which I won, followed by a short swim that activated the McMurdo light — not now — and then I was sitting in the back of the Sea King on my way back to Mother.

The journey home took one hour and 15 minutes. John Trotman poured me numerous cups of coffee, and I laughed the whole way. Six days later, I was flying again; and only three months and 18 days later, we sailed back into Portsmouth Harbour. ◄

Standing (left to right):
Lt. Neil Hogg, Lt. Greg Curth,
Kneeling (left to right):
AW2 Charles Crissman
AWAN Robert Bauch

Lt. Neil W.T. Hogg
Lt. Gregory P. Curth
AW2 Charles T. Crissman, Jr.
AWAN Robert J. Bauch
HSL-44

USS *Elrod* (FFG-55) was on patrol in the central Persian Gulf when it intercepted communications from an unidentified news helicopter; a merchant ship was on fire and out of control as a result of an attack by Iranian gunboats. The alert SH-60B was launched to investigate and determine if assistance was required. The 30-minute alert crew was airborne in eight minutes.

By establishing communications with the news helicopter and determining its location with the aircraft's surface search radar, the SH-60 crew was able to quickly locate the stricken ship 40 miles east of the *Elrod*.

Unable to communicate with the merchant ship, Lt. Hogg (aircraft commander) decided to close the position to determine the extent of the damage, after verifying that the area was clear of hostile ships. The initial fly-by revealed the entire superstructure of the Korean ship *Hyundai 7* was ablaze. The main deck was engulfed in flames that prevented movement along the deck; most of the cargo of lumber was enveloped in flames and the lifeboats on the superstructure were also on fire. The Seahawk crew spotted 20 sailors huddling under an overhang on the forecastle. The stricken ship's crew appeared to be in great distress and some were throwing pieces of wood overboard to use for flotation if they abandoned ship. Because of the approaching darkness, the condition of the ship's crew and the raging fires, Lt. Hogg elected to make a helicopter rescue.

AW2 Crissman (leading crewman) prepared to hoist survivors while AWAN Bauch (rescue crewman) prepared the cabin to receive injured personnel. After completing power checks, determining the wind conditions, and evaluating the limited hover options, Lt. Hogg chose to hover in a quartering tailwind to make the rescue. AW2 Crissman directed the pilot to a high hover over the forecastle, which was obstructed by ship's rigging and whip antennas. With Lt. Curth (copilot) providing essential instrument cross-checks, AW2 Crissman kept Lt. Hogg in the optimum position for the rescue. All hoists were complicated by the survivors' lack of familiarity with procedures.

Once the survivors were in the aircraft, AWAN Bauch treated them for shock and minor burns. One individual was suffering from a severely lacerated foot and possible broken ankle that required immediate medical attention by the rescue crewman. While still in the initial hover, Lt. Curth began coordinating additional rescue assistance with the Royal Navy frigate *Scylla* and her embarked Lynx helicopter.

Lt. Hogg decided to transfer the first two survivors to the *Scylla*, which was closing the location at high speed, and was 15 miles closer than the *Elrod*. Lt. Hogg made an athwartship landing on the modified *Leander*-class frigate.

The SH-60 returned to the blazing Korean ship twice and hoisted 11 survivors while the Lynx rescued 9. By late afternoon, with the sun

BRAVO ZULU

below the horizon, the entire crew of the merchantman was on board *Scylla* and receiving additional medical attention. The *Hyundai 7* was abandoned with fires burning out of control. Rescue and salvage tugs did not arrive until several hours after sunset.

Lt. James F. Porter
Mr. John Norman
HT-18

Lt. Porter was en route to Lawson AAF, Ga., for a maintenance recovery of a squadron helicopter. Flying at 1,000 feet and 110 knots, with Mr. Norman, a civilian maintenance troubleshooter, in the copilot's seat, Lt. Porter saw two hawks at the 10 o'clock position at a rapidly decreasing range. He made an immediate level turn and saw the birds pass very close abeam along the port side of the helicopter. Rolling wings level, Lt. Porter returned his scan to the 12 o'clock position in time to see a third hawk closing rapidly. The bird passed through the rotor arc, impacted the windscreen, and passed over the glareshield, striking Lt. Porter.

His helmet and visor were shattered, and his nose was broken. Bleeding profusely, Lt. Porter passed the controls to Mr. Norman and instructed him to begin a descent. During the descent, Lt. Porter saw a parking lot, took the controls, and flew a precision approach to a no-hover landing in a confined area.

Left to right:
Mr. John Norman,
Lt. James F. Porter

As one of the prime operators of tactical jet aircraft, the Israel Air Force would be expected to have a lot to say concerning the pyschology of ejections. Here is a story from Israel Air Force Magazine that sheds some light on how one of the most combat-proven air services in modern times considers this important area.

The Decision to Eject

By LtCol. Yosei Tal, IAF

DESPITE improvements in ejection systems, there is still a high percentage of fatalities when aviators use those systems. In 1987 only 88 percent of the total ejections in the Navy were successful. For most of the fatal ejections, cause is directly related to the pilot's delay in initiating ejection, or ejecting outside the envelope of the seat, and not the failure of the system.

Pilots eject more easily from an aircraft that has developed a technical problem than from an aircraft that was forced by its operation into a position where ejection becomes mandatory; if you must eject, you'd prefer that the cause be engine failure rather than that the aircraft had entered into a spin during an aerial engagement.

Conflict in Facing the Decision to Eject. It is possible to understand the factors and emotions involved in ejecting, which involves a system sometimes operated by a psychological "switch." Conflict, and specifically the conflict facing ejection, is characterised by a rational and emotional conflict between a number of responses — the advantageous and disadvantageous sides of the situation. The final decision to eject is also influenced by personal and environmental factors.

Environmental factors include state of the art systems, aircraft, speed, altitude, time and location. The conflict surrounding ejection is compounded by desires to save the aircraft, to improve or save the pilot's professional image, to respond to the expectations of friends and superiors, and on the other side, by the instinct and desire "to get out of this alive."

A situation requiring ejection is an exceptional one, causing pressure for any pilot. Consideration under pressure is different in character from that in a situation where there is no pressure; emotions play a role.* That is to say, the decision reached under pressure is not reached solely by rational consideration to achieve the best possible action, but also by the degree of pilot sensitivity.

We will examine possible solutions for this ejection conflict, along with the corresponding advantages and disadvantages. It is important to note that the concepts "too early," "in time" and "too late" are very subjective and reflect more the pilot's concepts and his values rather than the accepted norm or the definitions in his emergency checklist.

The advantage of early ejection is the relatively low degree of danger for the pilot, while the disadvantage is loss of an aircraft that might have been saved. An additional disadvantage is the drastic decline in the pilot's professional image held by his peers, friends, superiors and himself.

The advantage of ejecting too late is the image enjoyed by the pilot. If the emergency situation that caused the pilot to consider ejecting was caused by poor operation of the aircraft, this type of advantage carries considerable weight in the decision-making process leading to ejection.

The real disadvantage in ejecting too late is the degree of danger in which the pilot places himself. Many cases in which the pilot ejects instinctively are ejections outside the envelope.

Ejection "in time" occurs with a balance between the advantage and disadvantage. The pilot tries all the possibilities for saving his aircraft while remaining within a reasonable degree of danger. Ignoring the aspect of value and relating only to the question of finding a solution to the ejection conflict, this is the best alternative. Ejection according to the emergency checklist, as discussed below, is an example of ejection "in time."

In order to solve the conflict of ejection facing the pilot at a critical point in the procedure, we have determined that the minimum altitude for ejection is 6,000 feet. The importance of this decision is that with no dependence on considerations and emotions, you have to eject or you will endanger yourself if the seat does not work.

From a psychological point of view, it is possible to say that a lack of experience in ejections reflects a lack of any solution to the conflict, or the inability to decide what is the advantage for the pilot compared to the price he may have to pay. On the other hand, this alternative may reflect an instinctive decision to carry on to the end, an alternative where the expected advantage is considerable — saving the aircraft and considerable prestige — as compared to the greatest disadvantage: loss of life and loss of the aircraft.

Factors That Might Influence the Decision to Eject. While I cannot cover all the factors that influence the ejection decision, I will refer to a few specific ones.

The answer to the question "Who is the pilot who is subjected to the ejection conflict?" has considerable impact on the decision to eject. A pilot with ambition or a poor reputation may see the situation as an opportunity to raise his image level and, as a result, may place himself in an unreasonable degree of danger.

Experience as a Factor. The conflict of ejection for an experienced pilot is much harder than for a younger pilot; people

*See "Pressure and the Response of Aircrew to Combat," Approach, Sept. 88.

expect less from a junior aviator. An experienced pilot who ejects too early faces more criticism with a resulting detrimental effect on his professional prestige. The experienced pilot believes, more than the younger pilot, in his ability to escape from the situation he faces. These factors may push the experienced pilot in the direction of the "too late" solution.

Leader vs. Wingman. A definite order to "Eject!" given by a flight lead to a wingman or crewman can bring about a realistic solution. This is because, in a situation where there is conflict, the considerations of advantage versus disadvantage by No. 2 are no longer relevant. The leader's decision will determine the correct solution.

The definitive order from the lead to eject considerably reduces No. 2's responsibility for his aircraft. In the case of the first USAF aircraft from which a pilot ejected, in 1949, the ejection came on the lead's order.

(The incident was actually during a test flight on May 31, 1949. Capt. Vince Mazza took off in a modified TF-80, with Maj. V.A. Ford as the pilot. After climbing to 10,000 feet, Maj. Ford punched a button that illuminated a warning light for Mazza. Ten seconds later, Capt. Mazza successfully ejected at 550 mph. — Ed.)

Emergency Situations That Lead to the Ejection Conflict. When an engine cuts out and cannot be restarted, and the emergency checklist calls for ejection, the conflict is easier to resolve than in a situation, such as a spin, caused by the pilot's improper operation of the aircraft. The conflict is easier when the engine cuts out because the pilot can only benefit and has nothing to lose. The pressure to save the aircraft exists, but only up to a reasonable degree. When the plane enters a spin, the responsibility for losing the aircraft, if the pilot ejects, is his. This can lead to an extreme solution to the conflict, i.e., ejection too late or none at all. In this connection, I quote the conclusions of one of our investigation boards.

"The fact that the pilot left it very late, thus ejecting outside the envelope, appears to reflect his inability to face an additional failure in the most important thing in his life, flying."

This pilot faced the conflict of whether to eject for the third time in his career. Two earlier situations were as a result of a bird strike and as a result of a spin. In the third case, he ejected very late because he lost control of his aircraft.

Two-Seat vs. Single-Seat Aircraft. A two-seat aircraft has a number of advantages relating to finding a realistic solution to the ejection conflict. This solution is the result of the consideration of the benefits and disadvantages by two people, which makes it harder to reach an extreme decision. Ejection too early is impossible because the two aircrew members are witnesses to each others' decision. On the other hand, an irrational decision is also impossible because of each individual's responsibility. The fact that the responsibility for the decision to eject is split makes it easier to stand up to criticism and, therefore, makes it easier to reach a realistic solution: a reasonable examination of all the possibilities to save the aircraft, providing there remains only a reasonable degree of danger.

Improved Ejection System. There may be an exaggerated belief in the performance of the systems and a lack of real knowledge about their actual performance. An ejection seat defined as "zero-zero" is not really "zero-zero." It is zero-zero-zero-zero-zero, where the three additional zeros are pitch, roll and altitude loss. The improved system, for those who do not know the systems well, can cause people to believe the system can rescue the pilot from any situation.

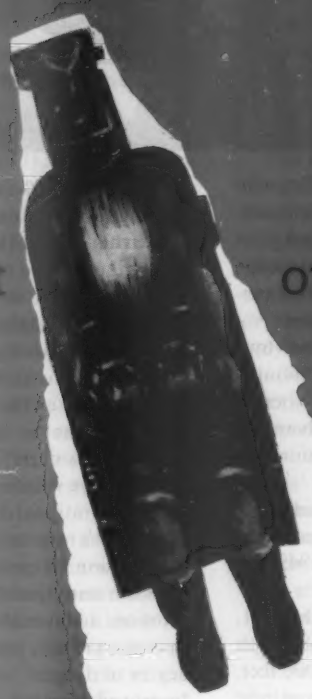
I chose to describe ejection as a conflict with a number of solutions, of which each has advantages and disadvantages. I also described some of the factors that may influence one or the other of the solutions. It seems to me that presentation of the delay in ejecting will make a pilot more aware of this conflict, and he will be able to approach it more realistically and rationally. ◄

LtCol. Tal is Head of the Research and Information Branch of the Safety Flight Division of the Israel Air Force.

A special thanks to Brigadier General Joshua Shani, Air Force Attache, Embassy of Israel, and Stuart Rosen, Israel Aircraft Services, who translated the original story from Hebrew.

INTO

By Lt. Michael C. Wade



The seat went off with a loud bang, and I

THE ISLAND

an NFO's eye view

I zoomed into the darkness.

WINDY and choppy seas surrounded us as we walked on elevator No. 2, where our EA-6B *Prowler* was spotted for the 1800 go. The sun had just set, and I knew we were facing a black, moonless night. We were slated for a routine night ECM raid against USS *Richmond K. Turner* (CG-20) and a dark night would aid us in avoiding fighters. I was flying as ECMO 2 in the right rear seat of the aircraft. Our crew consisted of a nugget ECMO 1, experiencing one of his first Case III launches, an experienced pilot and me, a second-cruise lieutenant.

We'd just returned to sea from a long Christmas stand-down in Naples, Italy, and this was our first night flight in more than three weeks. Our brief was thorough, and we, as a crew, had elected **not** to wear our wet suits because the air/water temperature was one degree above NATOPS minimums.

Preflight in the gathering darkness was normal. I checked the top of the aircraft, the ECM pods and then strapped in. The engines were started, checklists performed and radio checks completed expediently. While we waited for taxi directions, I noticed that the ship was now rolling and pitching quite heavily and thought to myself that it would be a hell of a night to punch out. Our turn came, and we armed our seats and taxied in line for catapult No. 1. By now the darkness was complete.

Sitting behind the catapult, something came over me and I began to prepare more meticulously than usual for the coming shot. I'd never been unprepared, but I'd become a bit careless. Tonight I arranged my LPA perfectly and positioned my toggles where I could find them quickly. I adjusted my ejection seat, positioned my arms and legs and gave my lapbelts and torso harness an extra tug for snugness. Finally I located the lower ejection handle and locked my harness.

The whoop of an S-3A careening off the cat ahead of us and the bang of the piston hitting the water brake signaled our turn. We taxied forward onto the cat and went into tension. I heard the engines spool up to full power, our ECMO 1 finished the takeoff checklist and the pilot signaled for launch. I braced for the acceleration, but we delayed momentarily while the cat officer waited for the bow to come up in the swells. I felt a bump and momentarily felt acceleration, but as suddenly as it started, the G-forces slacked and we were moving down the catapult track far too slowly for takeoff. My first reaction was disbelief — that I was really having a nightmare. But I came to my senses quickly and realized that the cat had somehow failed and was probably pulling us slowly off the bow.

The rear seat of the EA-6B contains only one instrument, an altimeter, and allows no forward vision. I looked to the right and left and saw only blackness. The aircraft was still moving forward at full power, though, and I figured we had three or four seconds before the bow. I heard the pilot say *get ready* over the ICS, and without hesitation, I pulled my lower ejection handle when four seconds had passed.

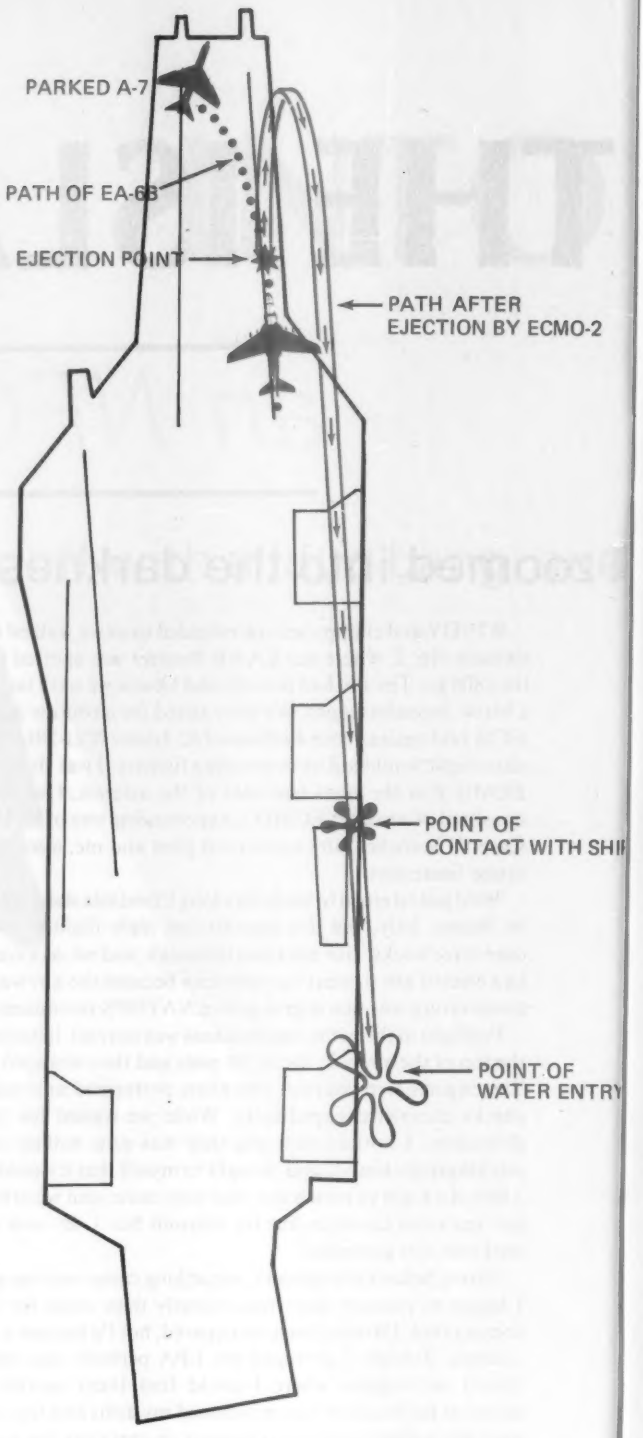
The seat went off with a loud bang, and I zoomed into the darkness. During the ascent, I instinctively began performing IRK (Inflate-Release-Koch), my low-altitude version of IROK. I remember feeling my LPA inflate as I neared the silent apex of the ejection arc and then the comforting bang of the chute snapping open in the wind. Hanging in my chute, I turned around and found myself 200 feet above the bow, facing the ship and a flight deck crowded with airplanes. Things began to happen quickly as my chute, buoyed by a 50-knot wind, accelerated me into the island. I dropped my raft and braced for a collision with the superstructure. I saw the yellow deck lights close with a blur just before I felt

the sharp jerk of my canopy snagging something above, twisting me around and slamming me into a steel bulkhead. I hung briefly, the wind knocked out of me, then dropped like a stone.

Because it was black below, I knew I was over the water, so I released my chute, crossed my legs, folded my arms tightly over my chest and straightened my body so I'd hopefully hit either feet first or head first. I was concerned about getting knocked out, bursting my LPA or breaking a limb. I entered the water feet first, almost vertically, and in spite of my LPA I stayed under for several seconds. Those moments under that cold black water were chilling to the marrow, and every molecule in my body strained to get me to the surface. When I broke the surface, my raft was floating a foot away and my chute was gone. (Later I learned that I'd collided with the aux conn of the navigation bridge and fallen 100 feet to the water.) I was heartened when I realized I'd ejected safely, survived both a collision with the ship and a 100-foot fall and was now floating with a good LPA/raft, clear of my chute and four feet from steel. I thought I had it licked and would be back in the ready room in a few minutes with a great sea story. So I began to let down. **That was a mistake.** Fifteen seconds had passed since the catapult had failed.

I swam away from the ship, mindful of the screws and turbulence. When I'd moved far enough away, I attempted to enter my raft but neglected to use the proper technique and tried to pull myself onto the raft without first attaining the proper body position. Finally, after several unsuccessful attempts, I used the proper technique. Again I was thwarted, because I hadn't removed my butt plate. (I'd left it on because I couldn't remember where the retaining lanyard was and was afraid of losing the raft.) I disconnected the butt plate and managed to enter the raft but was constantly turned out since the sea was so rough and the wind was so high. The effort of getting into the raft was tiring, and after about four or five attempts, I was exhausted. Next, my oxygen mask went slack on my face, indicating the bail-out bottle was empty. I discarded my mask and let go of my raft because the sound of an approaching helicopter indicated that my rescue was imminent.

I turned my attention to signaling the helicopter and tried to open my vest and get out my strobe. I had difficulty locating the tab in the darkness, and because I was becoming extremely agitated, I attempted to rip it open with brute force. The ship had disappeared behind the waves, and I was cut off in the towering seas. Without the oxygen mask, I was having trouble breathing in the waves and spray and I was



APPROACH diagram by Frank L. Smith

frightened and beginning to panic. My water survival training and discipline came through, however, and I calmed myself, then methodically located my equipment in the darkness. I found my strobe and placed it on my helmet, fetched a day/night flare and set off the night end. By now I could see the helicopter working his way upwind, and my hopes soared. Six minutes had passed.

The helicopter hovered around me for some time without stabilizing, and it was obvious that he was having extreme difficulty maintaining a hover in the 15-foot seas and 50-knot winds (he also had a malfunctioning doppler). For about 15 minutes, he drifted around me erratically. At one point I glimpsed a SAR swimmer arc through the air at the end of the rescue hoist and disappear into a wave. I never saw him again, but he did manage to return safely to his helicopter, stripped of his mask and flippers. Seeing his difficulty, I feared that the water was too rough for the helicopter to effect my rescue. The helicopter began to fly upwind, then drift back, trolling the harness near me. On the third attempt, I saw it about six feet away and managed to lunge out and grab it. Unfortunately, the helicopter couldn't see that I had hold of the harness and continued to circle. I was dragged for several seconds, still clinging desperately to the horse collar with my numb fingers. Finally, during a brief pause in movement, I scrambled to the top of the collar and snapped my "D" ring in. I was now going wherever that helicopter went, but the helicopter continued to fly about, searching for me, and I was dragged helplessly behind. This nightmare continued for about a minute, and all the time I was struggling for air and concerned that I might be rendered unconscious by the beating I was taking. Suddenly the cable went very slack as the helicopter reversed course. Frantically I signaled that I was hooked up, but there was no response, and the helicopter began to move away rapidly, taking up the slack. Soon the cable snapped taut, jerking me out of the water to my knees, at which point my "D" ring mercifully failed and I fell back into the water, dazed and struggling against a wave of blackness. I knew if I blacked out for even a few moments that I would drown.

My head cleared slowly, and I realized I was alone and concluded that it had been deemed too risky to attempt further rescue. I'd been in cold water for 30 minutes now without a wet suit, and I was feeling signs of hypothermia. I couldn't maintain the huddle to conserve body heat, because I needed my limbs to swim and balance myself in the high seas. The balance was needed to control my breathing between the spray and the waves breaking over my head. I

I fell back into the water, dazed and struggling against a wave of blackness. I knew if I blacked out for even a few moments that I would drown.

was further demoralized when I found that the violent jerk of the harness had ripped my radio loose and I couldn't even talk to another human being. My hands and lips were numb, my strength was waning and I slipped to the lowest point of my life. My realization that death was near was depressing me, and the isolation was sapping my will to live. I could only see ships and lights occasionally as I crested a wave. I was dying alone in a blackness pierced only by the strobe light marking my position in the night.

After 5 or 10 minutes of solitude, I heard the comforting sound of an approaching helicopter and came out of my depression. I took steps to beacon my position and popped more night flares. The helicopter soon saw me and hit me with a searchlight from about 60 yards downwind. With the Aldis lamp on me, I popped two of the day-end flares to aid the pilot in determining the wind and watched the pilot creep up slowly until he was 15 yards away. There he lowered a SAR swimmer part-way down so the swimmer could signal my position to the hoist crewman, who relayed it to him. This was very successful, and soon the helicopter harness was within 15 feet of me. At this point, the swimmer leaped off the harness and swam over to me and my spirits soared.

The SAR crewman asked my condition, checked me for injuries and then started towing me back to the harness, which was drifting away. We weren't making progress toward the drifting harness, but the hoist crewman above was alert to this, so he ran out all of the cable to stabilize the horse collar in the water. We reached the harness, and both of us grabbed it and were towed a few feet before it stopped. In an instant, I crawled into the collar, the swimmer snapped us in and we were hoisted into the helicopter. We returned to the ship, and I was treated for exposure and a gash in my arm. **I'd been in the water for 45 minutes!**

Words cannot describe the joy of crawling into the helicopter that night, nor can they accurately assess the courage of the SAR swimmer and the skill of the pilots and crewmen. That night, both of those helicopter crews risked their lives to save mine.

Preparation for this type of mishap is the most valuable tip I can pass on. Ninety percent of what saved my life that night were things I'd done before I ever strapped into that airplane. A decision I made almost killed me, however, and that was the decision not to wear my wet suit. This was based on the preflight OAT of 31 degree Fahrenheit windchill. We knew it would probably get colder but chose to ignore it. None of us enjoy wearing those wet suits, but if I'd been wearing mine, I might have lasted all night.

My ability as a swimmer was crucial to my survival. Not only had I completed DWEST four times in my career, but I'd served as a water survival instructor at NAS Pensacola for six months before attending flight school and was a certified Red Cross swimming instructor. The result: I was more confident in the extreme water conditions and could balance and control my breathing.

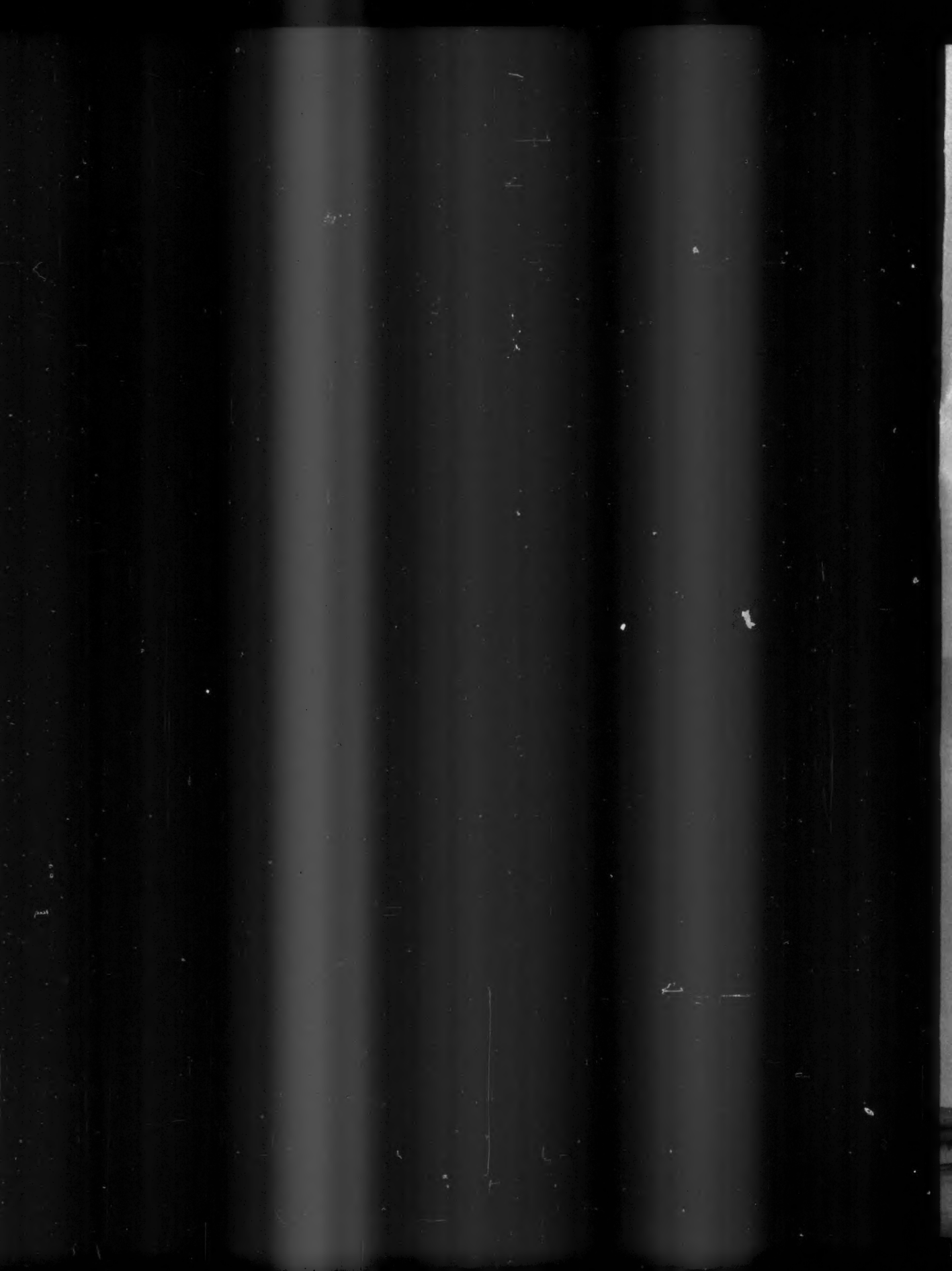
Other factors which helped me: I carried extra flares instead of a dye marker and shark repellent. My helmet was decorated with bright yellow reflective tape, and the helicopter pilot and crewman said this was the **most important thing** that aided them in finding me among the many lights that were in my vicinity. The helicopter pilots said they could even see the yellow reflection through the waves and spray! I was familiar with the location of the equipment in my vest because I'd accomplished a blindfold drill only 24 hours prior. Even so, more practice would have helped. **I'd drilled myself relentlessly about IRSOK and was able to perform it without thinking!** I'd made the decision to eject in the ready room months before. You must decide what your ejection parameters are while you have the luxury of debating the alternatives. Each of these things was crucial to my survival. In short, start preparing yourself RIGHT NOW — you can't do enough!

Finally, I'll comment on my water release technique. An article concerning this was printed in Approach (March 1982, "A Lesson Worth Learning") in which the author commented that he'd survived because he'd shed his parachute prior to water entry and hadn't suffered any ill effects from the 8- to 12-foot fall. I agree with him. I fell 100 feet and suffered only minor injuries, and I'm convinced that had I entered those heavy seas with my chute still attached, I'd have perished. I don't advocate 100-foot leaps, however, but advise crewmen to eyeball the flight deck and judge above-water release from that. I can't seriously envision any harm from even a 50-foot fall, and the alternative, drowning, is not attractive. I further qualify this be recommending early release only in circumstances where the survivor can clearly see and use the flight deck as a reference. Think about it.

The other two crew members elected not to eject. Miraculously, they were able to stop the Prowler with only a few feet left on the port bow. Regarding early Koch release, this article was based on Lt. Wade's 1983 ejection, which was pre-SEAWARS. The advent of SEAWARS removes the problem of parachute entanglement after water entry. —Ed.

Anytime things appear to be going better, you have overlooked something.

Ace L.



"... My next worry was the disabled jet and whether I was going to land on it or, worse yet, in a ball of fire."

A Very Dark Night

By LCdr. S.J. Himes

TEN years ago, as a student naval aviator (SNA), I manned aircraft 713 ready for my first TA-4J night radio instrument hop. This was my seventh man-up of the Skyhawk since reporting for advanced jet training. The syllabus called for an instrument takeoff "under the bag" with the SNA taking over from the instructor pilot (IP) at 80 KIAS. Instrument climbout, en route airways navigation and several approaches before landing were also on the agenda.

Brief and preflight went normally until I tried to fasten my lower koch fittings. The lap belts were adjusted uncomfortably tight, and I couldn't loosen them. The IP was almost ready to start, and, not wanting to add any delay time, I pressed hard against the rudder pedals, jammed my rear all the way back into the seat and managed to fasten the lower belt fittings. A bit tight, but the hop would be over in one and one-half hours, and I figured I could put up with a little discomfort for that long.

As we took the runway, the hood came forward. I lowered the seat full down and ran the rudder pedals forward until my thighs contacted the seat. With the seat down all the way, my line of sight was directly at the all-attitude indicator.

At about 50 to 60 KIAS, the aircraft began to drift left, then come back to the right. It went left again more rapidly, then came back to the right even harder. I realized something was wrong, but I hadn't any idea we were about to leave the runway.

Boom! The IP initiated ejection at about 80 knots, just before the TA-4J left the right side of the runway. My head was not in a good position at initiation, and I went up the rails with my chin buried in my chest. I remember the glow of the cockpit lit up by the flame of the rocket motor. I went sailing through the air. The "earburner" worked as advertised and I contemplated death while waiting for the shock of the opening parachute.

The chute opened, and my next worry was the disabled jet and whether I was going to land on it or, worse yet, in a ball of fire. About the time I realized I'd better think about a parachute landing, I crashed into the ground. After a few seconds, I stood up, disengaged the seat pan and walked to the crash truck. The TA-4J was resting upright with its nose gear collapsed about 20 yards from the woods and about 200 feet from where I landed. I had survived with no injuries, except for a stiff neck. I was back in the saddle in five days.

What did I learn? Expect the worst and be ready for it. I was not in the proper ejection position during a critical phase of the flight. Luckily, all straps were tight and my neck was flexible enough to withstand the shock.

Have a plan ready once you are safely in the silk. The unexpectedness of the ejection, plus my lack of aviation experience, really put me behind the power curve. By the time I caught up, I had safely landed. If the same ejection sequence had happened on a carrier launch, I probably would have drowned.

A night ejection is very disorienting. No news here. Maintain some frame of reference and carry out your plan despite confusion.

Thoroughly brief ejection situations and procedures. Be especially attuned to aviators with little ejection seat time, i.e. SNAs, SNFOs, junior aircrewmen and VIPs.

All the Approach articles I've read are correct. Know when to go, then go! And have a plan ready once the parachute opens.

LCdr. Himes is assigned to VS-32, flying S-3s.

A Very Short Flight

By LCdr. Bill Mnich

THREE weeks before a major WESTPAC deployment is not the best time to round up a squadron pilot for a weekend cross-country. All the bachelors had last-minute things to do, and none of the married guys felt like spending one of their final weekends in CONUS jetting off to the East Coast while the wife and kids waited at home. After exhausting all possibilities in my squadron, I received the skipper's blessing to widen the search to include the FRS and every other outfit on base.

After a week of dedicated effort, the only nibble I had was the XO of another command, an old squadron-mate I had worked for in a previous tour. Although it required him to change some existing plans for the weekend, he wanted the flight time and agreed to go. Two days later, we were on the flight schedule for a Friday morning departure.

After discussing the route, weather and overall game plan, we suited up and headed for maintenance control where I was pleased to discover we had been assigned one of the stronger jets on our line. It had completed a PMCF for some minor work and had no outstanding gripes that would concern us on a cross-country.

After a normal preflight, man-up, start and taxi, we waited out a lengthy departure delay and finally took the runway. I called base to report airborne, checked in with departure control, then settled in for what I presumed would be a very pleasant trip over the desert southwest to our refueling stop at Tinker AFB. As departure cleared us to 11,000 feet, I felt the familiar push from the engines as the XO advanced the throttles for the climb. In restrospect, this was the last familiar sensation I would experience on what was destined to become a very short flight.

Simultaneously with the power increase, I noted the appearance of wispy tendrils of white smoke in the rear cockpit. I mentioned this immediately to the XO, who replied that he had heard "some kind of a bang" in the airplane and had secured the enviromental control system (ECS) as the smoke appeared up front as well. No sooner were the words out of my mouth when the "AWG-9 COND" light illuminated on my caution/advisory panel, indicating that the computer was exceeding its temperature limits. Suspecting a failure in the liquid cooling loop, I checked the tactical information display to confirm the problem, but was unable to read it through the increasingly dense white smoke. In 10 seconds, the smoke had become thick enough to completely obscure the instrument panel, leaving only the silhouette of the glare shield visible in the bright morning sunlight. Locating the appropriate switches by feel, I turned off both the AWG-9 and its coolant pump.

A few quick words with the XO confirmed what I had already assumed. We would make an immediate landing back at Miramar. I keyed the mike to declare an emergency and announced our intentions as he turned our failing jet to a downwind heading toward an unpopulated area northeast of the airfield. Although the first few words of my call were received, no reply was heard as we lost all electrical power immediately after the transmission. Except for the distant, muffled thrum of the engines, the cockpit was now silent.

Hoping that the emergency generator might restore partial electrical power, I fumbled blindly for the IFF to select a 7700 squawk while keying the ICS switch in a futile attempt to talk to the front seat. Glancing outside to check our position relative to Miramar, I noticed the wings had unexpectedly swept full aft, an action I knew had not been performed intentionally by the XO. Looking forward, I saw the silhouette of his helmet pressed against the canopy as he searched for terrain features to judge a tight 180 back to the runway. With the dense cockpit smoke, there was no way to visually land the airplane unless we jettisoned the canopy. In preparation, I tightened my visor and, forgetting that we had no electrical power, attempted to lower my seat. In a last-ditch effort to communicate, I disconnected one side of the oxygen mask from my helmet and yelled forward to the XO. He never heard me. We were now effectively blind and deaf in a smoke-filled

cockpit several thousand feet over northern San Diego, with a fire raging somewhere in the aircraft.

The next 20 seconds seemed like an eternity. I couldn't see, couldn't hear, couldn't communicate, and felt powerless to improve the situation. Electing not to jettison the canopy while the XO still had his helmet against it, I waited for him to do it himself whenever he felt ready. My thoughts raced ahead to our intended landing.

With two external tanks, we had started with 20,000 pounds of fuel, and without electrical power, couldn't dump a single drop. If the wings remained full aft, our approach speed would have to be nearly 200 knots. I still was not sure the XO was aware of the wing position (without power there would be no cockpit indication), and even if he were, I doubted that he could move them forward for landing. We would arrive unannounced, NORDO, flying a smoking convertible on a 200-knot straight-in! I didn't like the idea.

My train of thought was interrupted by a seat-of-the-pants sensation of mild pitch oscillations, although I had no attitude reference with which to verify it. Seconds later, I felt, simultaneously, a violent pitch-up that I knew could not have been pilot-induced, a sudden blast of intense heat around my head and neck and an orange flash in my peripheral vision. That was it. "Scared man" reactions took over, and without hesitation I yanked the lower ejection handle. As I would later find out, the XO had reached the same conclusion independently and had already put his right hand in motion from the control stick to his own lower handle when the ejection sequence was initiated.

The canopy disappeared immediately along with our little white cloud, revealing green hills and blue sky all around. I noted with amusement that the slipstream was causing my flight suite sleeves to flap in what appeared to be slow motion. As the milliseconds slowly ticked by, I cautiously peered around the right side of the glareshield, careful not to poke my head out too far into the breeze, and saw the XO up front sitting erect in his seat. My next thought was that the whole ejection sequence seemed to be taking entirely too long. Convinced that the seat had failed, I pulled the lower handle again, harder. About that time the normal 0.5-second timing delay finally elapsed, and I blasted off with a tremendous roar. It was the first real sound I had heard in what seemed like ages since our electrical failure.

After a brief series of jerks and tugs as the seat performed its job, I found myself hanging motionless under a perfect canopy looking at Interstate 15 between my boots and Miramar several miles to the west. Breathing a big sigh of relief at our deliverance from the confusion of a few seconds prior, I felt relatively comfortable and was satisfied I could manage the situation from here. Then, hearing the impact of the airplane behind me, I looked back to my left to see the XO in his chute and a huge fireball, which fortunately was well clear of any inhabited area.

As we slowly drifted in formation toward the thick column of oily black smoke, I realized that the wind was carrying both

of us directly into the flames! Noticing that the XO had pulled his four-line release and was steering clear of the conflagration, I did likewise. Thanks to the four-line system, we both landed a comfortable distance from the intense fire and settled unscathed into dense 6-foot chapparal. Somehow, I managed to steer myself directly into the tallest bush within a quarter-mile, and shortly after touchdown discovered a hidden barbed wire fence . . . the hard way.

A San Diego County sheriff's helicopter was on the scene in minutes and retrieved us from an impossibly tiny dirt mound on a steep hillside nearby — the only "clear" spot around. We were in the Mirarmar dispensary no more than 15 minutes after departure. Elapsed time from takeoff clearance to ejection was two minutes and 56 seconds.

The cause of this mishap was a catastrophic failure of the ECS bootstrap turbine/compressor, which started a 3,000-degree titanium fire in a critical area of the aircraft. This led quickly to an AWG-9 COND light, dense smoke in the cockpit, a total electrical failure, uncommanded wing sweep, divergent pitch oscillations, loss of control and finally, ejection.

The moral of the story is expressed most succinctly by the old Boy Scout Motto: Be prepared. Believe me, after launching into a clear, blue, California sky on a long-awaited Friday cross-country, the last thing on my mind was a parachute ride into the brambles after three minutes in a burning Tomcat. The XO, flying a borrowed jet on a relatively short-notice trip, was probably even more surprised. As Tom Wolfe once wrote, "It can blow at any seam." ◄

LCdr. Mnich is presently attending the U.S. Naval Test Pilot School at Pax River, Md.

Aircraft Down!

By Nick Saraceni

HERE'S the story from the other side: the Aviation Division of the San Diego County Sheriff's Department. Established in 1972, the Aerial Support to Regional Enforcement Agencies (ASTREA) originally flew three Bell 47 helos, the familiar little bubble-topped choppers. Besides making daily patrols and providing assistance to police, fire and local, state and federal agencies, ASTREA helicopters coordinate rescue efforts within San Diego County. In 1983, the Department acquired two Hughes MD 500D helos, similar to the Army's LOH-6.

ASTREA helos are periodically called in to help rescue military crews, which is understandable, given the high level of activity around the Miramar area. Typical of these military rescues was the ASTREA flight involving Deputy Pilot Rick Rains and Deputy Observer Mike Leathers.

Shortly after the two officers arrived at the San Diego Sheriff's office at El Cajon's Gillespie Field, they checked out their helicopter and waited for a rescue call.

"ASTREA 1J, respond to a possible military aircraft down, Poway by I-15." It was the message that an F-14 from Miramar had crashed, and the crew had ejected.

The two San Diego policemen scrambled. As they took off, they could already see the column of smoke to the northwest. Arriving on the scene, with Poway fire engines close behind, Rains and Leathers spotted two parachutes; soon afterward, they saw the two aviators on a raised knoll in the crash zone.

Pilot Rains dropped down toward the knoll and made a "toes in" landing in which the front skids are placed on a hillside and held to allow entering or exiting the helicopter. This effort necessitates the pilot literally flying the helo into the hill, keeping the aircraft straight and preventing the main rotor from striking any obstacles or the hill.

As Rains held the helo steady, Leathers got out to help the two Navy crewmen into the police chopper. Rains called Miramar tower to say he had the Navy fliers. He brought them to the Miramar dispensary, then returned to the crash site to coordinate the firefighting effort.

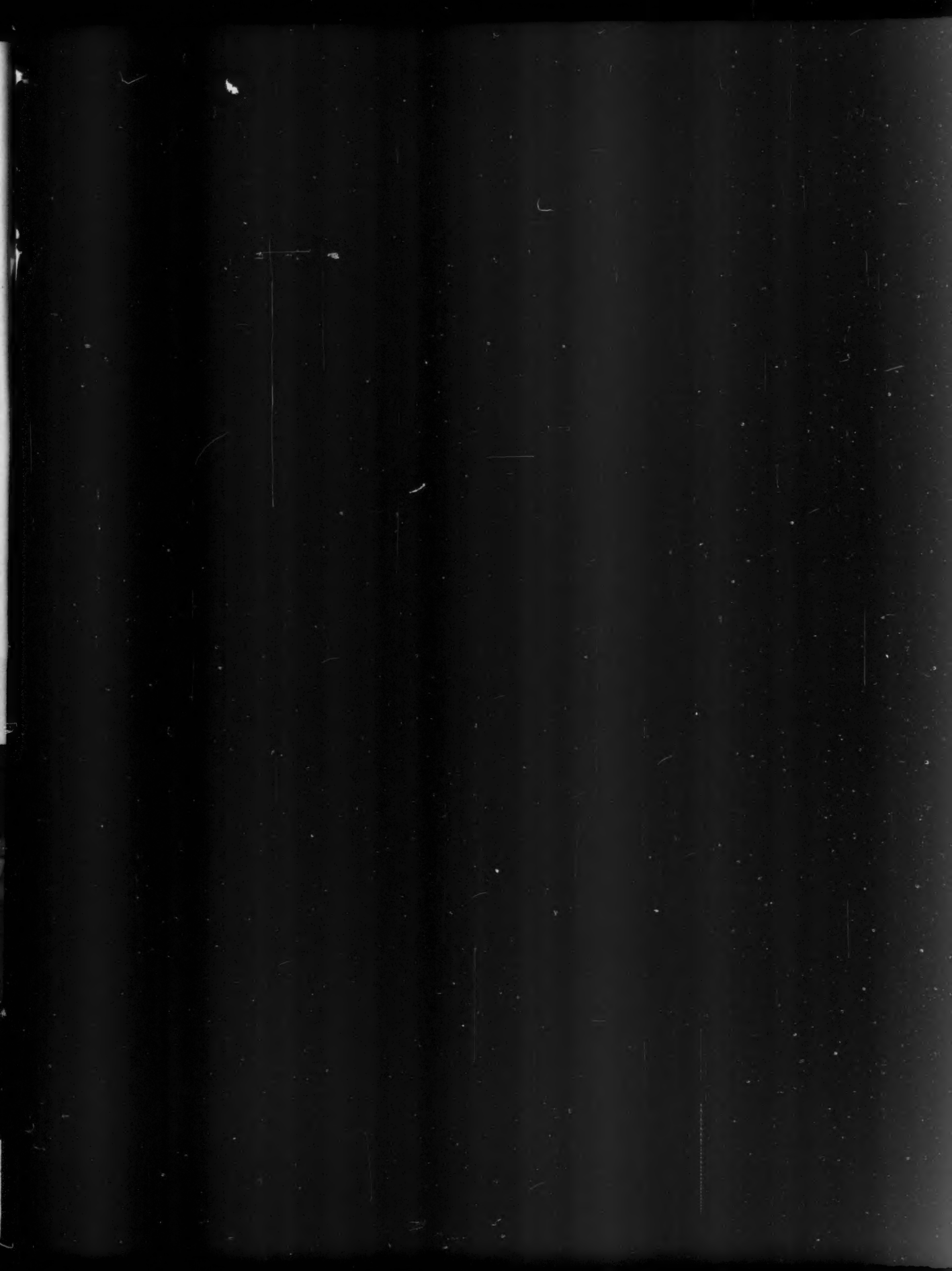
The F-14 had started a fire on the hill, and the fire trucks were having trouble reaching the site. The Hughes 500D carries a bucket — nicknamed the "Bambi bucket" — with a capacity of 120 gallons of water. The helo can scoop the water from any available source, such as a backyard pool. After returning to its home field, ASTREA 1J was quickly reconfigured with the bucket and made several runs over the fire, using water from nearby Lake Miramar to douse the fire.

With the fire out, the police crew returned to their base to clean up and return to patrol status. Later, in gratitude for their rescue, the two F-14 crewmen invited officers Rains and Leathers to Miramar to be made honorary squadron members.

Mr. Saraceni has been a deputy in the San Diego Sheriff's Department for 11 years. He is currently an observer attached to the department's Aerial Support Division.

Editor's Note: The proximity of many civilian police and fire departments to military bases on the east and west coasts, and the southwest training areas, and their involvement with military mishaps, such as described in this article, would seem to make familiarity with military aircraft a necessity. This is especially true regarding emergency egress procedures. Other areas include safing ejection seats and specific points, such as the presence of the On-Board Oxygen Generating System (OBOGS). How many civilians would know that with OBOGS, when the engine stops, so does the oxygen. Removal of a crewman's mask is primary in any rescue involving an OBOGS-equipped aircraft. The AV-8B has the system, and the F/A-18 is scheduled to get it soon.

Civilian SAR organizations might want to check with their local NAF or NAS fire chief to inspect the *NATOPS Aircraft Emergency Rescue Information Manual (NAVAIR 00-80R-14-1).* This book details various emergency safing and rescue procedures for every type in the Navy inventory. It's a handy reference, and familiarity with its contents would enhance a SAR crewman's capabilities to effect a successful rescue. Other publications of related interest are: *Joint Service Booklet No. 1 "What To Do and How To Report Military Aircraft Accidents," NFPA 424M "Manual For Airport/Community Planning,"* and *IFSTA 206, 2nd Edition "Aircraft Fire Protection."* Lastly, look for a new movie from the Marine Corps due for release later this year, *"Military Aircraft Mishap Planning (Off-Station)."* This might not be an Oscar winner, but certainly does have lots of information and is well worth seeing. ◄



Just Another Aviation Nightmare

By Lt. N.A. Filippone

"Eject! Eject!"

NOW, wait a minute. This isn't really happening, is it? This is supposed to be a piece of cake, a one-time shot to the beach after an uneventful day CQ period. OK, so we had to wait for some maintenance to be completed, and it got dark. That doesn't mean something bad *has* to happen, does it? Besides, the really bad things only happen on crash and burn tapes. We even paid extra attention to carrier-specific emergencies in the brief, and as long as you brief them, they won't happen, right?

Start-up and taxi were normal enough. Takeoff checks complete through the wings. Everything's looking good. Only 50 nm to NAS Homebase. We're practically there already. I suppose we're just about obligated to have a beer at the club for our buds who are riding the boat during this time. All right, lining up on the cat, and roger the weight board. Takeoff checks are now complete, controls and lights to go. Taxiing onto the shuttle. We're outta here.

There's the tension signal. Power coming on, wiping 'em out.

"You ready?" my pilot calls.

"Everything looks good back here."

"Same up here. Lights are coming on."

OK, copilot duties. Watch the airspeed, check for a positive climb and above all, make the airborne call sound cool. The cat officer touches the deck. The button is pressed, and we're gone.

Little squat, good pop out of the holdback. There's the pull. Oh, damn! What was that second pop? Why aren't we accelerating?

"Are we going to get it?"

"We'll see," the pilot says. Yeah, that's what I thought, too.

Airspeed is all that matters now, and it doesn't look good. This Tomcat is going to need at least 115 knots to fly, and we're just *knot* going to get there. There's no way we can stop, either,

Know your flight gear. I thought I knew mine. I know a lot more now. One thing common to both the pilot and me was that our first instincts, after making sure we were clear of our chutes, was to remove and activate our strobe lights.

which leaves only one other option. My hand is already on the lower handle. Boy, I really don't want to do this. The bow is coming up soon. Airspeed just under 80 knots. I guess it's time to go.

"Eject! Eject!"

Well, the Mini agrees with me. If something bad happens, it's not my fault. Little pull on the handle. That was easy enough. Bright flash, some popping sounds. Man, does this thing go! There goes the jet. Uh-oh, now I'm tumbling. This is probably not good. There's a tug at my shoulders. Now, that's a good feeling.

Let's see, it's time for procedures. IROK. "I" for inflate, find those beaded handles. There they are. You've got to be kidding. I can't be in the water already. Oh, well, back to the beaded handles. What are these lobes doing in the way? I guess the FLU-8 worked. Time to get rid of the chute. Hey, no risers on the koch fittings. The SEAWARS must have worked, too.

This could go on and on. It was an incredible experience, and all my senses were working at high speed to absorb the details. There is really no way to give advice on the decision to eject. Each situation is unique and must be individually evaluated.

Here's what we learned. First and foremost, it *can* happen to you. Ejections are few and far between, but you should be prepared each time you go flying. I was definitely one of those people who always thought, "It can't happen to me." Until this point, I had never even dealt with a serious aircraft emergency, so I figured I was just lucky. Well, it took only an instant for my luck to run out.

Know your procedures. In this case, I was lucky. I had completed refresher swim and physiology training in January. My ejection occurred in March. Would I have elected to attend swim training if I had a choice? No way. Am I glad I went? You bet.

Another bit of luck in preparation, not only did we hold squadron training on ejection at sea prior to work-ups, but I was assigned to give the lecture. I learned a lot preparing for that brief and thought about a lot of aspects of ejecting near the carrier. I hope the information I incorporated into the lecture and also the "motherhood" about having a plan before you need it was absorbed by my squadronmates. It turned out to be good advice for me. Your mind will have an extreme tendency to not accept the circumstances you find yourself in, and the next few minutes after the ejection are really not the time to decide what to do next.

Know your flight gear. I thought I knew mine. I know a lot more now. One thing common to both the pilot and me was that our first instincts, after making sure we were clear of our chutes, was to remove and activate our strobe lights. Being so near the ship, we both agree we felt we were in a rescue rather than a survival situation. We were also both unsuccessful in deploying our strobes. Why? Neither of us could extract the strobe light from our SV-2 pockets because the LPA lobes had inflated so tightly and prevented us from opening the pocket zipper. We didn't foresee this, and it was very frustrating. We have learned that the LPAs have been given a larger CO_2 charge to inflate them more fully, and we have recommended a survival gear change to move the strobe light's location.

Neither the pilot nor I was successful in using our PRC-90s either because we were not willing to remove our helmets in order to hear the small speaker. We have since been told we could hook the radio into the helmet earphones using the "banana plug" provided on the earphone cord. This involves using the UHF jack near the oxygen regulator on the mask, obviously impossible if you've discarded the mask. Using the PRC-90 in this manner is probably a tricky operation, but in our circumstances, it could have helped.

Finally, as with all naval aviation, remain flexible. Things will never go exactly as you expect, and it is easy to get frustrated. Our experience was that our adrenalin was flowing and our emotions were absolutely peaked. The pilot's first unforeseen problem occurred immediately after water entry. He landed back in the floating jet which had remained intact. The possibility of becoming entangled increased dramatically, but he refused to panic and stuck to proper IROK procedures, and extricated himself.

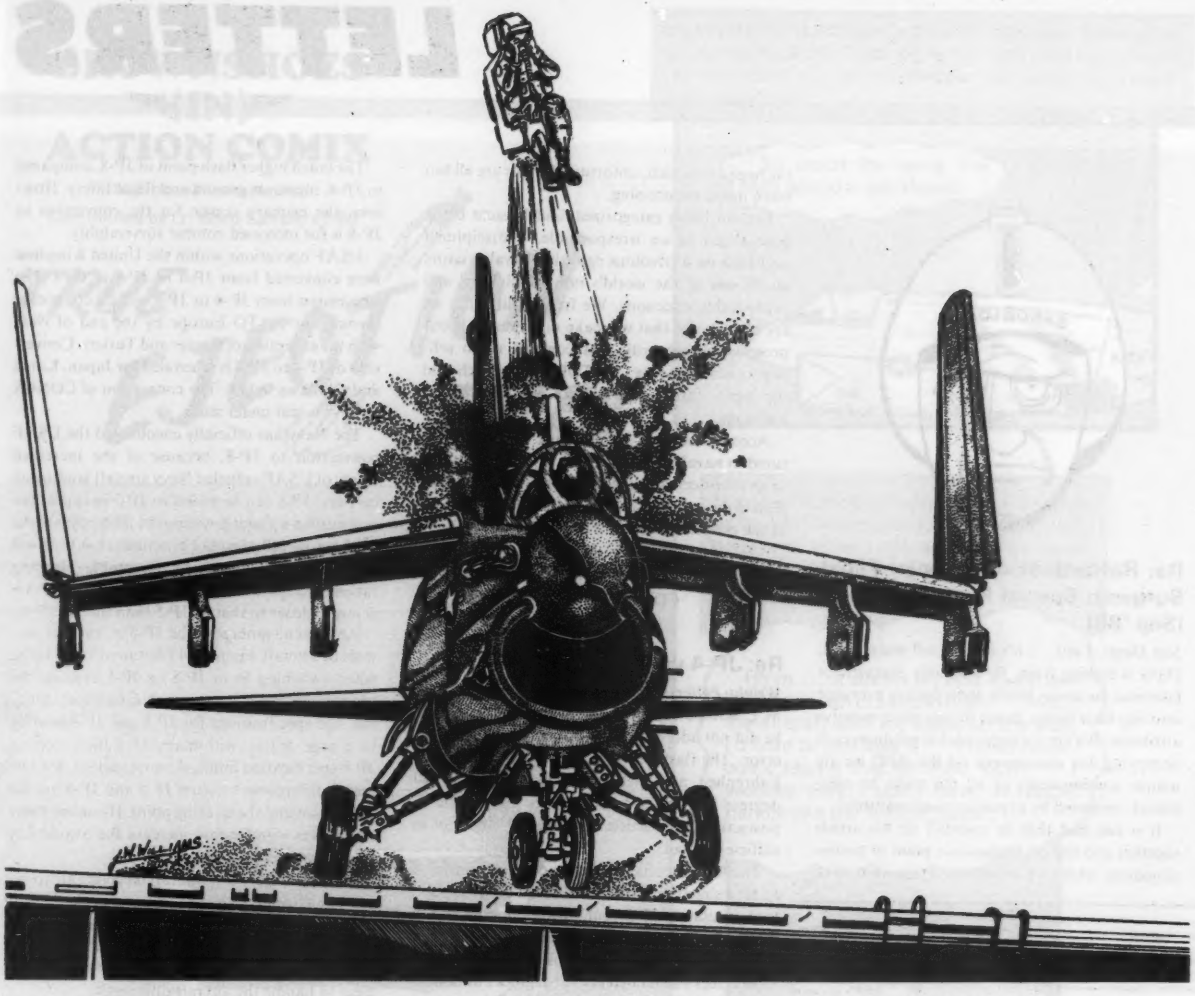
With the exception of the problem with my strobe light, everything went pretty much as I expected, until the helicopter arrived. The shower heads at the survival pool just don't do justice to the real rotor wash. Also, once the swimmer was in the water with me, I thought the rescue was just about over. I never thought he would lose his hold on the cable. Thanks to the helo crew's expertise, they flew the cable back to us, no small feat since we were not very maneuverable. Once again, it would have been easy to get impatient, because at this point, I was quite ready to get out of the water, believe me.

It will never be said that something good comes from a Class A mishap. Overall, this incident was fairly unremarkable, if you can say that about the loss of any aircraft. The pilot and I learned from the incident. One last thing, ask your flight surgeon about the post-ejection going over. If you thought NAMI physicals were bad. . .

Lt. Filippone is a RIO with VF-32.

If you explain so clearly that nobody can misunderstand, somebody will.

Ace L.



Eight Seconds to Eject

By Lt. Leon Doty

I AM an A-7 pilot nearing the end of my second WESTPAC deployment. Our air wing requires a representative from each squadron in the tower during Case I launches and recoveries so that someone is available if an airborne pilot needs help.

I was in the tower during a routine launch. One A-7 was still turning and was parked on the starboard side of the ship just in front of the island. I watched as the blue shirts began to remove the chocks and chains.

The pilot taxied forward, but when the yellow shirt signaled to stop, the A-7 kept moving. At that point the tailhook came down and the air boss called over the mouse that the A-7 had no brakes.

The aircraft picked up speed, and just before it reached the port side of the ship, the pilot ejected. The A-7 went over the side and was under water within seconds. The uninjured pilot was rescued from the sea within minutes — a successful ejection.

It took only eight seconds from when the pilot started taxiing until the ejection. This didn't leave much reaction time. He made his decision to eject long before the incident or had at least thought about a similar situation before manning his aircraft that day. Think about it the next time you go flying.

Lt. Doty is assigned to VA-27, NAS Lemoore, Calif.

LETTERS

Re: Reflections of a Senior Flight Surgeon: Special Kinds of Aviator (Sep '88)

San Diego, Calif. — It's hard to tell where Capt. Dully is coming from. Be it serious, sarcastic or facetious, he seems intent upon putting everyone into tidy little boxes, based on our gross negative attributes. We are not supermarket products each occupying our unique spot on the shelf; we are unique combinations of all the traits he mentioned, tempered by experience and maturity.

It is too bad that he couldn't tie his article together and end on the positive point of professionalism, which we all seek to attain, instead of the negative, which, unfortunately, we are all too often intent on stressing.

I resent being categorized, and I resent being generalized as an irresponsible, undisciplined occupant on a frivolous ego trip. Naval aviators are in one of the world's most disciplined and accountable vocations. We fully realize that we are human and that we make mistakes. It is our professional maturity that compels us to self-improvement; hence, NATOPS, Approach and the open forum atmosphere we attempt to maintain.

Accountability is indeed alive, well and nurtured in naval aviation. This is a fact measurable in an ever-decreasing mishap rate and readily evident in the enthusiasm, motivation and dedication of the people who comprise its ranks.

LCdr. Chip Lancaster
Naval Aviator
COMASWWINGPAC (Code 762)
NAS North Island

Re: JP-4 vs. JP-5 (May '88)

Wright-Patterson AFB, Ohio — The article by Lt. M.L. Busbee was excellent but incomplete because he did not address JP-8. Also, he had one minor error. The flash point of JP-4 is not 30 degrees Fahrenheit, as stated, but ranges from about -10 degrees Fahrenheit to 20 degrees Fahrenheit. A postscript to the article mentions JP-8 but not in sufficient detail.

The Air Force has wanted to convert from JP-4 to JP-8 since the late 1960s. JP-8 is a kerosene fuel, very similar to JP-5, but with a minimum flash point of 100 degrees Fahrenheit (vs. 140 degrees Fahrenheit for JP-5) and a lower freeze point of -53 degrees Fahrenheit (vs. -51 degrees Fahrenheit for JP-5). JP-8 is essentially commercial Jet A-1 fuel, but with a fuel-system-icing inhibitor, a corrosion-inhibitor and lubricity-improver additive and a static-electricity-dissipator additive.

The much higher flash point of JP-8, compared to JP-4, increases ground and flight safety. However, the primary reason for the conversion to JP-8 is for increased combat survivability.

USAF operations within the United Kingdom were converted from JP-4 to JP-8 in 1979. The conversion from JP-4 to JP-8 will be completed throughout NATO Europe by the end of 1988, with the exception of Greece and Turkey. Conversion of JP-4 to JP-8 is scheduled for Japan, Korea and Okinawa in 1991. The conversion of CONUS to JP-8 is still under study.

The Navy has officially encouraged the USAF conversion to JP-8, because of the increased safety of USAF-refueled Navy aircraft landing on carriers. JP-8 can be added to JP-5 in small concentrations without lowering the flash point of the JP-5 below 140 degrees Fahrenheit, but tests will be required to determine acceptable blending ratios. In a spill, the flame spread speed of JP-8 is is much closer to that of JP-5 than that of JP-4.

Another advantage of the JP-8 is that fuel controls of aircraft engines will not need readjusting when switching from JP-8 to JP-5 because the specific gravity of the two fuels are almost identical. The specifications for JP-5 and JP-8 overlap to a large degree, with many JP-5 fuels meeting JP-8 specification limits. As noted above, the two major differences between JP-5 and JP-8 are the flash point and the freezing point. However, these differences significantly increase the availability of JP-8 compared to JP-5.

In conclusion, Navy aircraft receiving air-to-air refueling from USAF tankers may receive JP-4 or JP-8, depending on where the Air Force tanker was refueled. Navy pilots should ask which fuel they receive, since the carrier recovery crews may elect to handle the aircraft differently.

Charles R. Martel
Technical Area Manager
Aero Propulsion Laboratory

"Talk about coincidences. Remember that high-voltage wire I hit last October?"

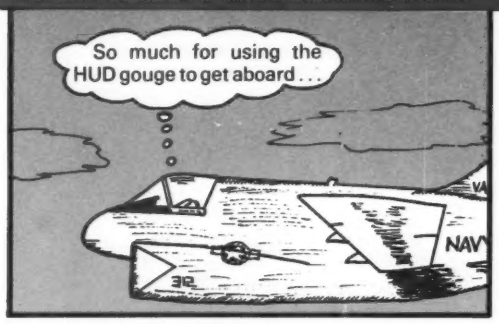
BROWNSHOES IN ACTION COMIX

"The kind real aviators like"

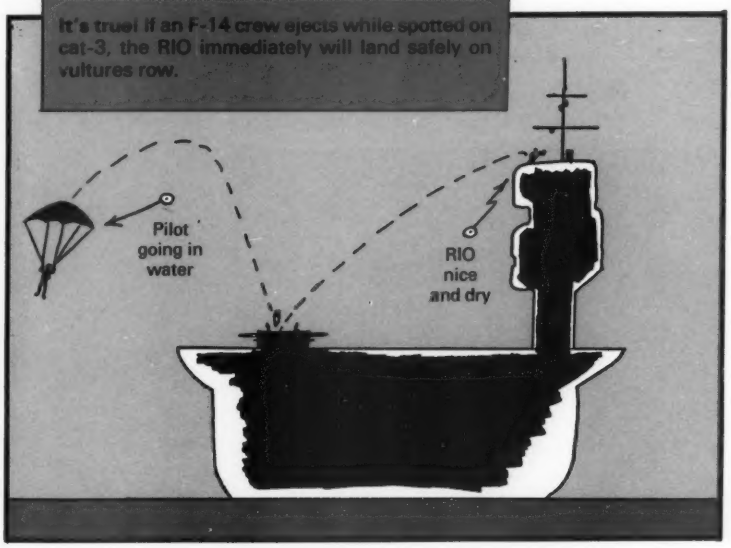
Contributed by Lt. Ward Carroll, VT-86

TRUE EJECTION TALES

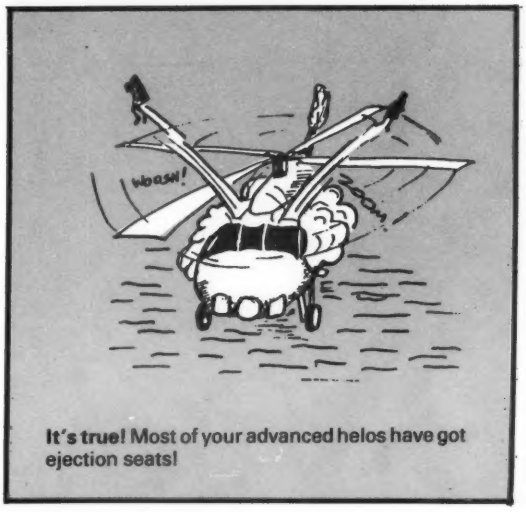
It's true! Cdr. Bill Freeny, who insists he was the originator of the "Kick the Tires, Light the Fires" saying, actually flew an entire hop with the ejection seat pulled for a corrosion inspection.



It's true! If an F-14 crew ejects while spotted on cat-3, the RIO immediately will land safely on vultures row.



It's true! Although some ejections appear to be split-second decisions, "time compression" affords the aircrew the opportunity to go through a complex and objective thought process.



It's true! Most of your advanced helos have got ejection seats!

. . . But seriously folks, know when to go, then go!

PRESS.

It's something weight lifters do, but pilots who want to be around for awhile

DON'T!

Be professional and stay within the limits of your mission.